

In This Issue—*Routing Maintenance Work Effectively*

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MOTOR AGE

Vol. XLII
Number 15

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CHICAGO, OCTOBER 12, 1922

Thirty-five Cents a Copy
Three Dollars a Year

Dependable **Champions** For Every Engine Everywhere



The average car owner gets a lot of satisfaction out of the appearance and completeness of his car, and he is glad to have suggestions that will add to his comfort and pleasure. He wants you to suggest equipment that will save him time and trouble. When a motorist stops at your gas pump, or comes into your store or garage, the profit on the goods he asks for is already made, and he is a live prospect for any automobile equipment that is not on his car.

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Now is the time to suggest CHAMPION PRIMING PLUGS to your Ford and Fordson customers and those who have Farm and Stationary Engines, for with these plugs, starting a cold motor is positive because the gasoline must go right where the spark is—at the firing point—and less gas is needed.

Sudden changes in temperature, damp or cold weather will cause you no delay after you have your engine equipped with CHAMPION PRIMING PLUGS.

"ASK 'EM TO BUY" Full Sets

CHAMPION SPARK PLUG CO.,

Toledo, Ohio





Why the "Sunbeam" Sells Best

1—The Sunbeam is the only **Universal Visor**—the only Visor that "fits any car in America". You don't have to carry two or three makes of Visors to supply the demand; you have only **one** stock, **one** investment, **one** purchase account, **one** sales plan.

2—The Visor itself is the finest piece of equipment we know how to build—and every sale carries a liberal margin of profit for you. The Sunbeam Visor is equipped with genuine "Thoma Process" quarter-inch ribbed glass, **GREEN** or **AMBER**.

3—The Sunbeam Visor is backed by a hard-hitting co-operative sales plan. We consider the sale is only half made when we sell you—we complete the job by helping you sell the Visors to car owners in your community.

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This nameplate
identifies every
Sunbeam Visor



Write for details
of liberal dealer
proposition

MOTOR AGE

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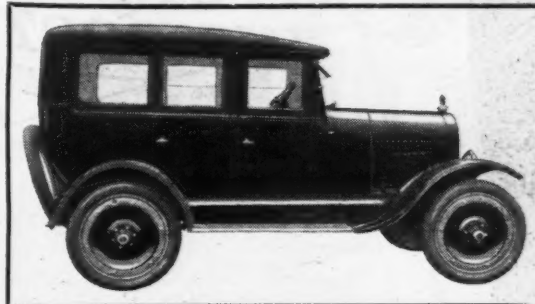
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Ames Bodies for Ford Chassis



THE ANSWER TO THAT BIG DEMAND!

The economical operation and durability of a Ford chassis is appreciated everywhere. But thousands of people want enclosed models this winter which are just as economical—but better looking, more comfortable and more distinctive.

The Ames Tour-Sedan Body for Fords solves this problem in a remarkably attractive way. It is 16 inches longer than the Ford body, with four full doors. It is fully equipped with gas tank at rear—vacuum feed and all the little refinements so much appreciated in a closed car of modern design. Special reinforcing eliminates squeaks and rattles—and perfect balance assures long, satisfactory service.

This body retails for only \$350.00 f.o.b. Owensboro, Ky. Mounted on a new Ford chassis it costs only a few dollars more than the Ford sedan. It offers wonderful opportunity for handsome profits in rebuilding used Fords.

There are five other Ames Bodies for Fords—each one just as distinctive and economical in proportion. They are meeting with a great, nation-wide success, because they fill the big, popular demand at a popular price.

If there isn't an Ames dealer in your territory already supplying this profitable market—why not do it yourself? Write us for details.

The F. A. Ames Company, Inc.

862 Third Street, Owensboro, Kentucky



Road-Coach



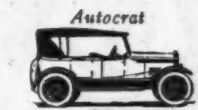
Sport-Roadster



Tour-Sedan



Thoroughbred



Autocrat



Racer





Clip this ad from the Oct. 21st "Post" and paste it in your window. It will sell timers for you.

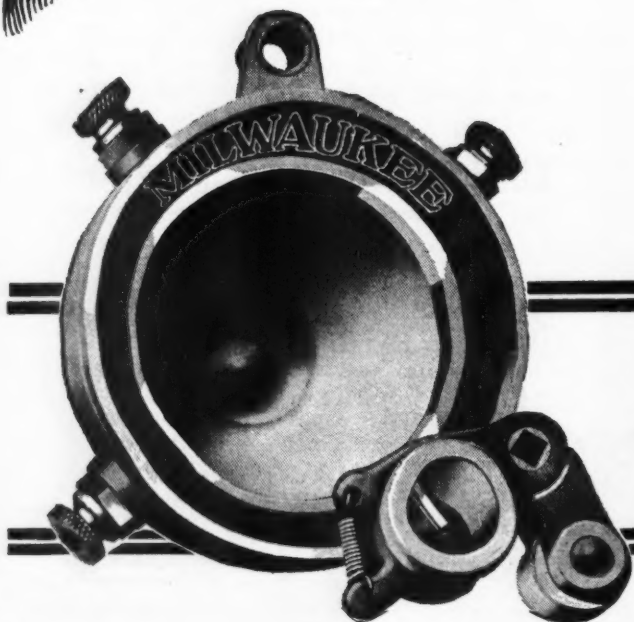
"They Sure Are Helping Me!"

"ANOTHER Milwaukee Timer full-page in The Saturday Evening Post October 21st! Great stuff! *There's* a manufacturer who doesn't expect me to do *all* the selling. He makes sales for me—and sales mean *profits*. You bet I'll feature Milwaukee Timers!"

That October 21st full-page ad in the "Post" will stir up a lot of timer business for you. It appears right at the start of "timer replacement time"—just when most Ford owners are getting "Henry" in shape for winter. The more you take advantage of this full-page ad—the more you display and push Milwaukee Timers—the more money it will make for you. It's going to sell a lot of timers for a lot of dealers. Will you be in on the profit?

Replenish your timer stock now. Order Milwaukee Timers from your jobber. If you want a 5-color Steel Stand to help display your Milwaukee Timers, write us for one. Sent to you, free, postpaid.

Milwaukee Motor Products, Inc.
Milwaukee Wisconsin
(Timer Builders for over 17 Years)



MILWAUKEE TIMER for FORDS

Sells Fast at \$2.00

MOTOR AGE



These two illustrations tell a story in themselves about routing work through the maintenance department. In one the cars are parked in an orderly way and any one can be moved without affecting the others. This arrangement is, of course, especially suited to establishments doing a storage business, but it lends itself well to the repair shop and quick service department. The other view shows many cars placed about the room in a more or less confused manner. It would be hard to move a car in the center of the group without moving many others as well.

Routing Maintenance and Repair Work to Get Greatest Efficiency

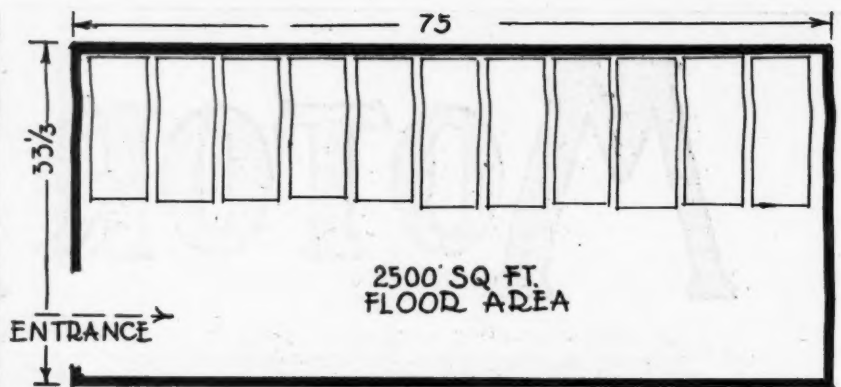
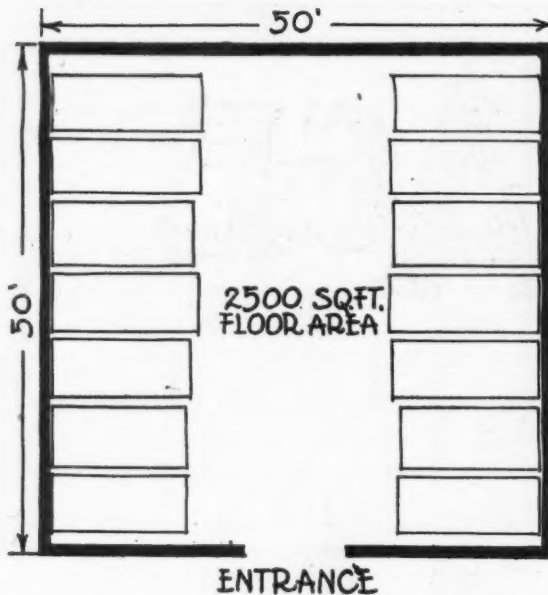
*Putting Cars Through the Shop Systematically
MAKES MAINTENANCE PAY*

By B. M. IKERT

JUST as the production manager tries to get proper sequence to the operations performed in a factory, so should the service manager try to get proper sequence to the various operations performed daily in the maintenance department. It should not be neces-

sary to move a car from one department to another haphazardly, only to find that it has crossed its own path a half dozen times.

If the dealer is planning a new maintenance building or plans to remodel the present building, certain things



Here are shown two floor plans, both having the same number of square feet floor area. It will be noted that the center aisle arrangement is preferable because more cars can be accommodated, and besides the aisle is wider

should be kept in mind to make sure the work can be handled with the least amount of confusion. It must be remembered that at times the work will peak. Consequently the establishment should be laid out to handle these peak loads effectively.

Some maintenance departments have plenty of floor space so far as area in square feet is concerned, but this space may be so proportioned that it cannot be used to advantage. The smaller sized maintenance building is very often the most prolific waster of space, because it is impossible to locate the various departments properly so that cars can be routed through the building to take advantage of the space available.

Other things being equal the larger the maintenance department and the more specialized the kinds of work, the easier it is to lay out and route cars and repair work through it. The small establishment to be self supporting usually has to take in a variety of work on other makes of cars and consequently cannot employ as high a degree of specialization in departments as the maintenance department which sells its output on one make of car only, and then, usually in the large city where there is greater volume.

The size and shape of the building have much to do with the routing of the work. Some buildings are of such shape that good routing is impossible. Single story and two or more story buildings also must be reckoned with. This very often is controlled by the value of the ground per front foot.

The width of a building to be used for maintenance has much to do with its capacity and efficient handling of cars. The same is true of the aisle locations, entrances and elevator location. To take a typical case, reference is made to the illustration herewith, showing two layouts of buildings, each having 2,500 sq. ft. of floor area. It will be noted that one of these easily can take care of twelve cars and the other but nine.

The one building is 75 ft. long and 33 1/3 ft. wide and capable of housing but a single row of cars along one side, while the other side is given up to form the aisle. This, when compared with the other layout, shows that it is a very poor arrangement on account of the wasted space. It is impossible to get more than nine cars into the building.

In the other floor plan the center aisle arrangement is used with a different shaped floor, the floor in this case being 50 by 50 ft. Here the greatest amount of space is utilized because it is possible to get twelve cars into the building and still have ample room to move the cars around without interference. For straight storage purpose this shows the center aisle arrangement to be the best. Such an arrangement, for instance, can be used to advantage in a dealer's maintenance building for the department given over to the temporary storage of finished cars awaiting the customers.

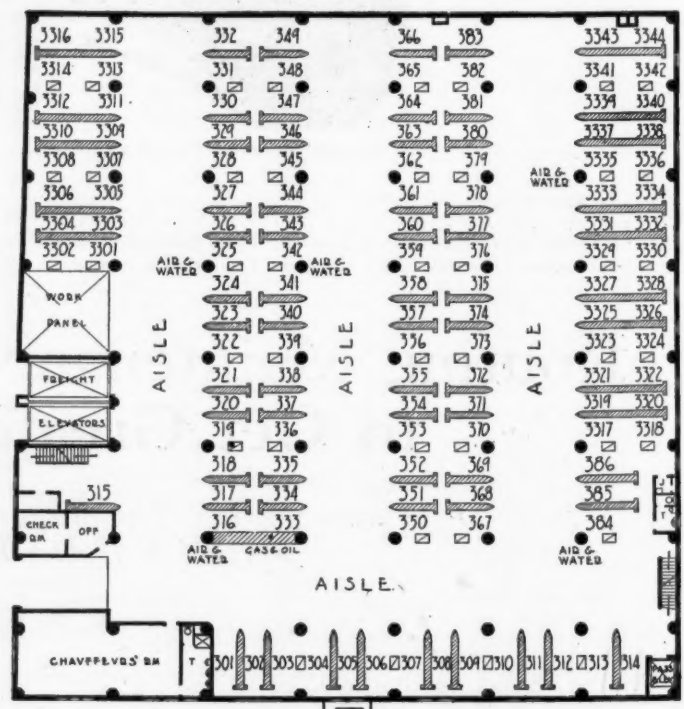
The latter floor plan also seems to indicate that the best

width of floor lies between 50 and 60 ft., depending upon the length of car to be accommodated. Where a shop intends to cater to all makes of cars, naturally provision must be made to handle the longest car built, theoretically, at least.

There are a good many things to be considered when figuring on an ideal routing system for cars and usually an ideal system is impossible, especially in the smaller buildings, because they very often are given over to both the selling of cars and the selling of maintenance. This makes a difference, because here we must allow for a salesroom, accessory department, offices, restroom and stockroom.

A building layout intended for a combination of sales and maintenance is shown on these pages. The approximate dimensions of this building are 60 by 150 ft. with a total floor space of 9,000 sq. ft. and a capacity of about 22 cars in the shop. The separate entrance and exit is intended to give the best routing under the conditions and to make it possible to handle the short or "quick service" jobs in the shortest possible time. The service manager's office is located close to the entrance, so the customers can get immediate attention. All car locations in the shop are such that any car can be readily removed or changed about without disturbing the others.

As will be noted in this layout the drive into the salesroom has been located at the side of the building instead of the



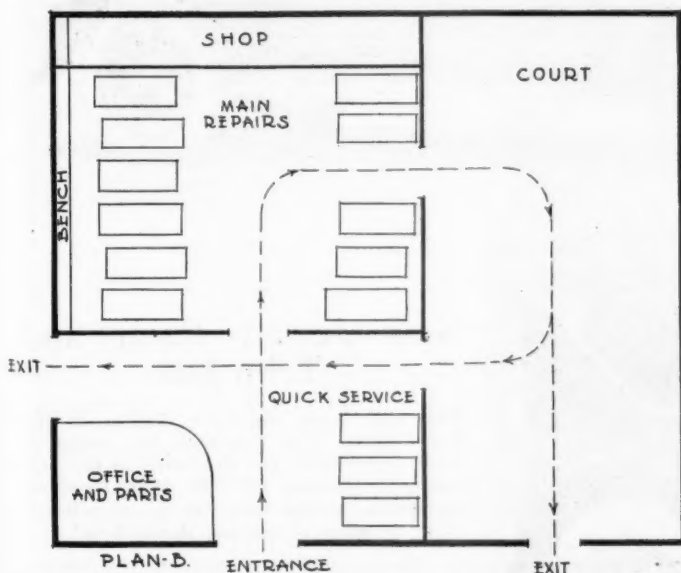
center. This makes it possible to get one more car into the salesroom and is a distinct advantage especially when the building is located on a corner and full advantage can be taken of the corner space for display.

Two building layouts are shown on these pages which are arranged to afford handling much of the work in the open courts adjacent the building proper. The advantages of this are many. In the first place it makes possible the handling of all small and short jobs in the court and thus leaves the building free for the more involved jobs. For instance, such operations as installing accessories, adjusting brakes and clutches and setting tappets, can be handled readily in the court. Car owners can be given immediate attention and drive their cars out without interference from other cars or departments.

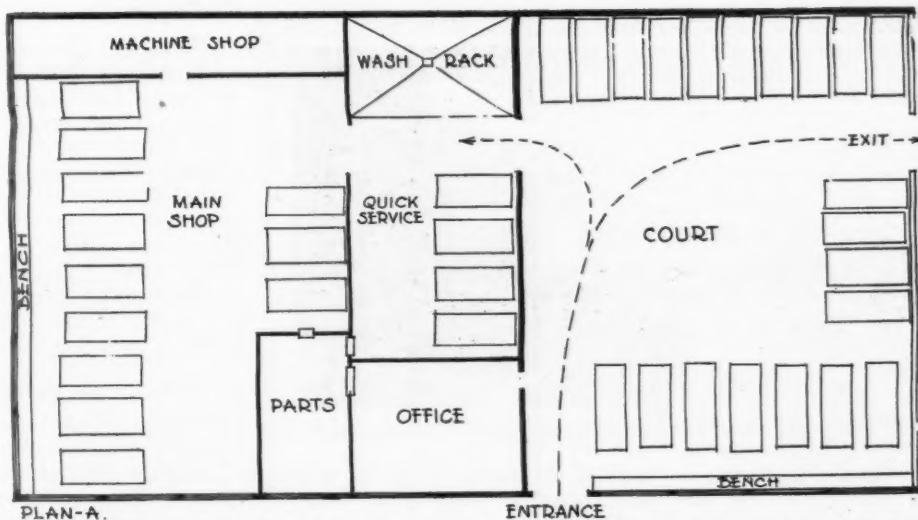
The maintenance work that comes into each place of business is of a varied nature. Some jobs require 1 min. and others days at a time. Consequently the building must be planned and the work so routed that each job can be handled properly. No car, for instance, which requires but a half hour's work should be backed into a room with many other cars in front of it which might require several hours' work.

The procedure of handling service work can be likened very much to customers entering a restaurant. If a man wants a cup of coffee and a doughnut he will sit down at the counter. If he wants a whole New England boiled dinner, he sits down to a table. Just a case of good routing on the part of the management.

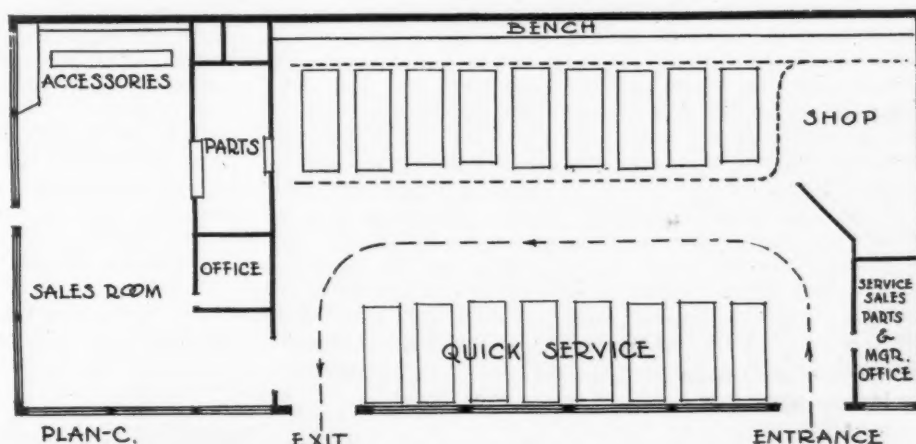
A close study of the two layouts with open court attached will reveal that false movements are practically nil. No matter for what a car enters the premises, it can be routed through without confusion once the service manager, or whoever is in charge of ascertaining the wants of the customer, knows what is required.



Here is shown another floor arrangement of a maintenance station having a court. In this place the owners must drive into the building proper for quick service operations. The dotted lines show the various paths of travel possible in routing the work systematically



The dotted lines in this drawing show how cars can be routed through the place with little or no trouble from interference. The court allows of quick service jobs and it is not necessary for owners' cars to enter the building itself for the more common operations



Here is a good routing arrangement made possible by the entrance and exit being located on the side of the building. There is practically no wasted space here, since the passageway from salesroom to maintenance department can be used for added display purposes

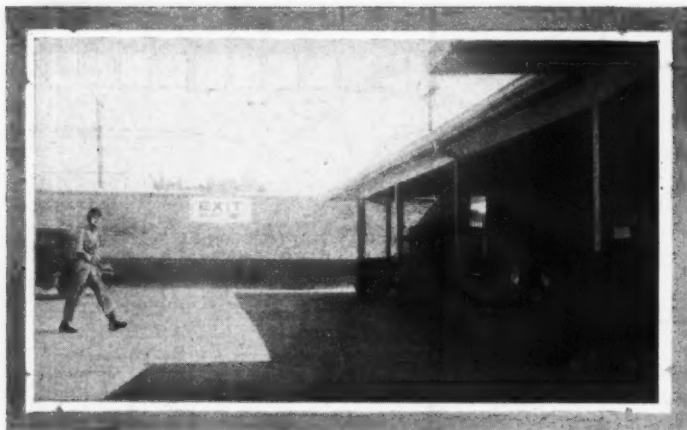
Suppose, for example, that a car owner drives in for a carburetor adjustment, at a station laid out as in plan A. He stops his car in the court in front of the service manager's office, where an attendant ascertains his wants and sees to it that his car is driven into one of the stalls along the three walls inclosing the court. However, for a very small adjustment the car may not even be directed to a stall but be allowed to stand in the center of the court. Once the adjustment is made, he can drive out the exit unhampered.

For the jobs which require some tearing down and fitting the cars are placed against the wall just to the right of the exit, where a work bench with vises and tools, affords most of the usual shop conveniences.

Then there are the quick service jobs, which, however, are a little more elaborate than those handled in the court. These jobs include valve grinding and new clutch plate installation. In the layout A, these jobs would be handled in the department designated "quick service." It will be noted that the cars can be run in here very easily and in no way interfere with the cars in the court or those in the main repair shop.

The latter shop is given up to work running into considerable time, such as a complete tearing down and rebuilding of the engine and axles. The machine shop is located in such a manner that it can handle the work of the main repair shop and in addition that of the quick service department. Handling the latter work is accomplished by a door or window communicating with the machine shop.

For instance, on a valve grinding job, which would be handled in the quick service department, the valves might need refacing on a grinder, the machine for which would be located in the machine shop. To save a man's time in walking from



This shows a portion of the court of the Hudson-Brace Co., Kansas City, Mo. Courts are especially valuable in handling quick service work

one department through another and then finally to the machine shop, the door or window to the machine shop reduces time and steps to the minimum.

In locating the parts department preference has been given to the main repair shop, because it is there that most parts will be used. The quick service department will use some, of course and for that reason a window in the parts department opens into the quick service department. Also, there will be many parts sold to owners over the counter. This counter is located in the main office. Thus the parts department location as in plan A has much to do with good routing of work through the entire building.

The wash rack in a plan like A, might well be located to open into both the quick service department and the court. In localities where there is little cold weather it might be well to locate the wash rack in the court. It should, of course, be protected with a roof, similar to that shown in the accompany-

ing illustration of the Hudson-Brace Motor Co. court in Kansas City.

It will be noted in plan A, that the office is about centrally located. This makes it possible for the service manager to keep in touch easily with all departments which radiate from this point. The office is handy to customers and all clerical work is made easier from the fact that the parts department, in which there always is a great deal of handling of orders both from shop and customer necessitating making requisitions and billing, is located so close to the office. The plan A has been made with the thought that the building is a one-story affair.

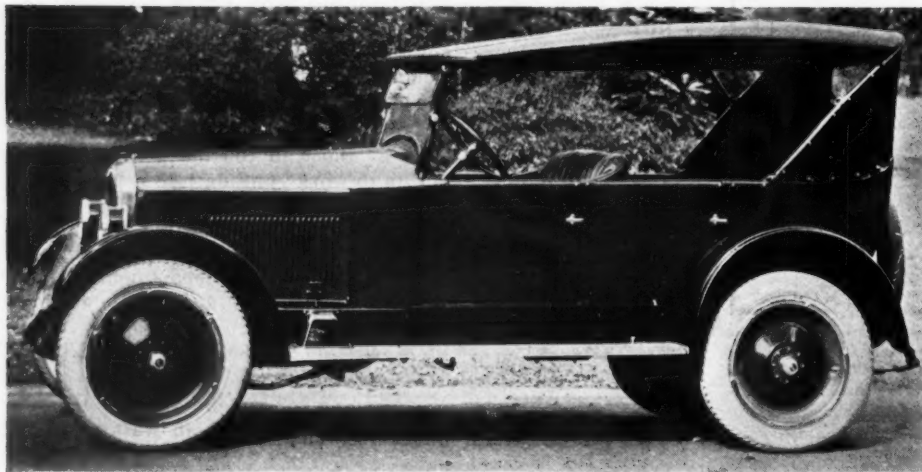
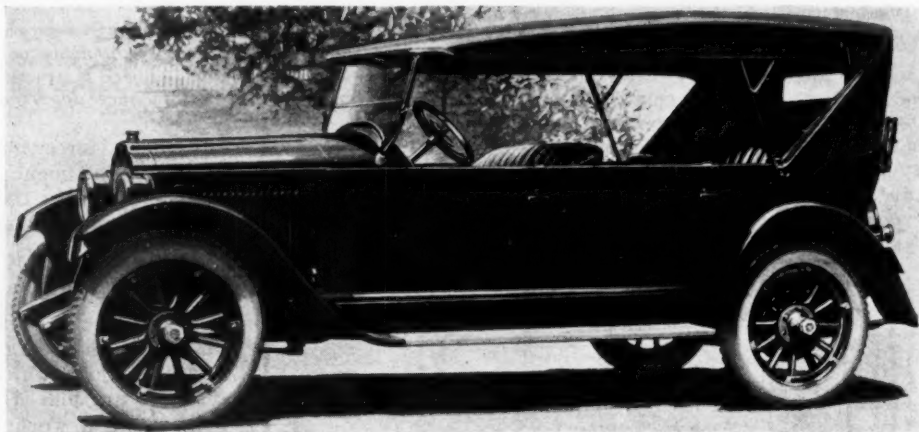
Plan B is also that of a one-story structure but with an entirely different layout from A. In B the office and parts department are located on the corner, with the quick service department immediately to the left of the entrance. If a car comes in for a very short job it can pass out by making a quarter turn to the left. For more involved work the car drives straight through into the main shop. The exit from this is through the door opening into the court, from which the car can pass to the street through the court exit. A careful study of this plan will reveal that the work can be handled with the greatest dispatch.

Plan C has been prepared to fit the conditions of the small town dealer, who usually cannot afford a separate building for his maintenance department. The building combines a sales-room and maintenance department. Here again, the parts department has been so located that it is accessible to both shop and customer.

The service manager's office and such parts as are in frequent demand by the shop are located immediately to the right of the maintenance department entrance. Thus when a car comes in and stops at the service managers office, the wants of the customer can be quickly ascertained and the car routed accordingly. There is a space for "quick service" and across the aisle all work of a more involved nature is handled. Such work as includes tear down jobs. An overhead carrier makes it possible to take engines and axles, to the shop proper for the necessary operations.

Willys-Knight Adds Seven-Passenger Phaeton

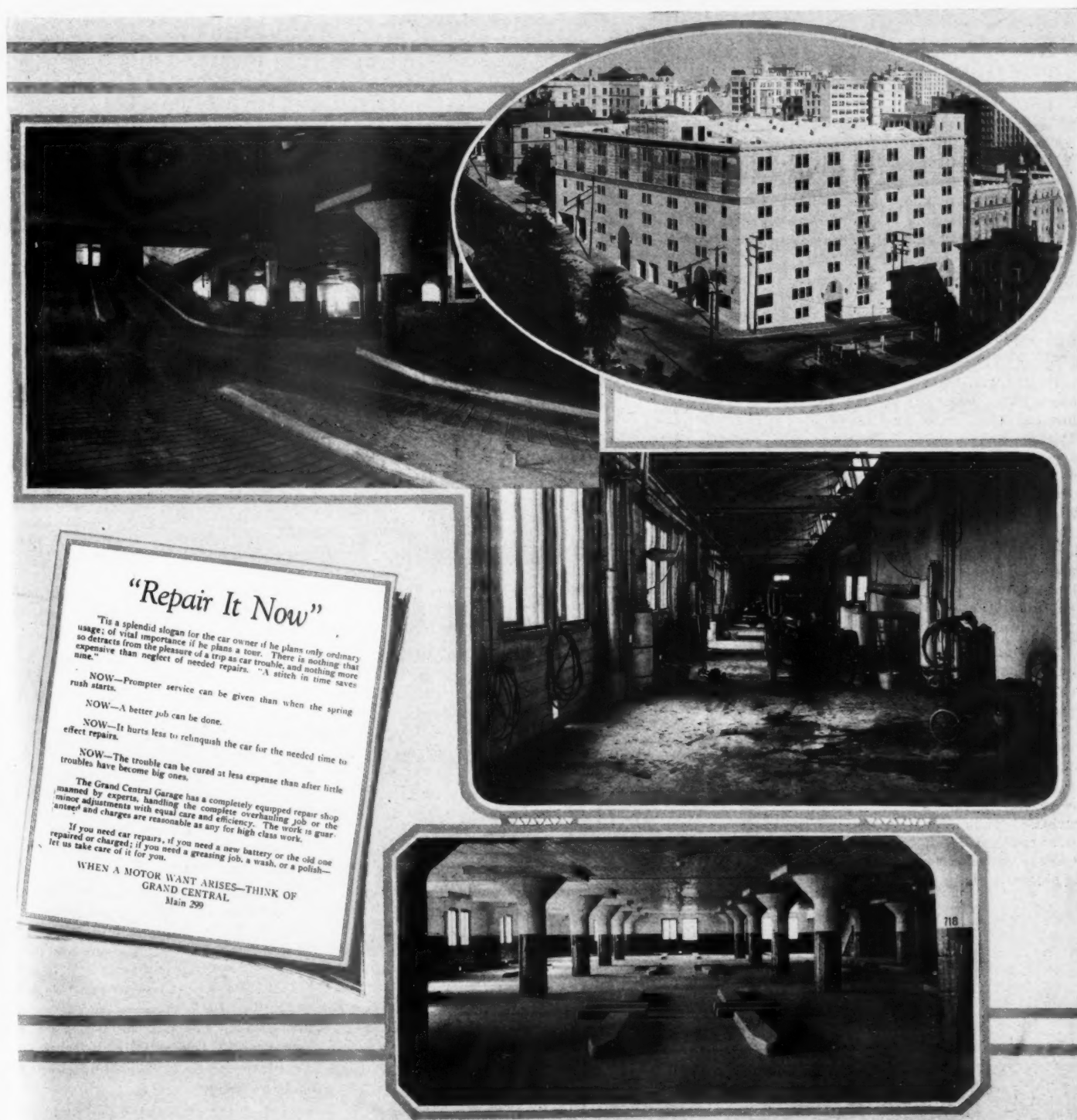
The new seven-passenger Willys-Knight which resembles very closely the five-passenger car. The wheelbase of the seven-passenger is 6 in. longer. Excepting for the extra seats in the tonneau, the general layout and units are identical with the smaller car



New Jewett Paint and Trim Job

This new paint and trim job, which the Paige Motor Car Company has added to their Jewett line, was described in the September 28 issue of MOTOR AGE. By error, the wrong cut was used with this description in place of the one shown here

Some Sidelights From a Successful Public Garage



"Repair It Now"

'Tis a splendid slogan for the car owner if he plans only ordinary usage; of vital importance if he plans a tour. There is nothing that so detracts from the pleasure of a trip as car trouble, and nothing more expensive than neglect of needed repairs. "A stitch in time saves nine."

NOW—Prompter service can be given than when the spring rush starts.

NOW—A better job can be done.

NOW—It hurts less to relinquish the car for the needed time to effect repairs.

NOW—The trouble can be cured at less expense than after little troubles have become big ones.

The Grand Central Garage has a completely equipped repair shop manned by experts, handling the complete overhauling job or the minor adjustments with equal care and efficiency. The work is guaranteed and charges are reasonable as any for high class work.

If you need car repairs, if you need a new battery or the old one repaired or charged; if you need a greasing job, a wash, or a polish—let us take care of it for you.

WHEN A MOTOR WANT ARISES—THINK OF
GRAND CENTRAL
Main 299

Perhaps the most striking thing about the Grand Central Garage of Los Angeles, Calif., is that five floors of the building can be reached from the street level. The illustration shows how this is accomplished. But there are other reasons for showing these pictures.

For one thing, we wish to call attention to the ramp system which is used in going to and from the various floors. This building is used chiefly for storage purpose, and for a building of its size the ramp system for routing cars to and from floors is by far the quicker method. However, the building is provided with freight elevators and passenger elevators.

The storing of cars is systematically handled by the use of parking islands, as shown in the lower illustration. This establishes definitely the "hole" for every car and all danger of damaged fenders and bodies is practically eliminated.

Note also that the posts are painted a dark color for a certain height to hide finger marks and help to always give to the place a neat and tidy appearance. This is something that could be used to advantage in many maintenance stations in such departments as are frequented by customers. In fact, it would do no harm to have the repair shop or machine shop finished in the same way.

The Grand Central Garage operates a repair shop for its patrons and the letter above shows how it goes after business. The view in the laundry shows the compressed air hose, quick acting jacks and banks of electric lights, all handy for doing a good job.

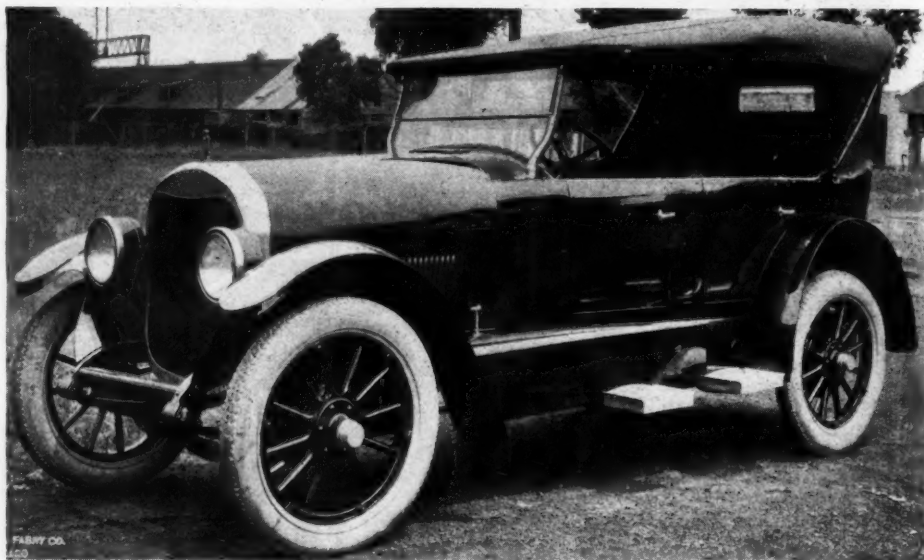
American Steamer a Low Priced Five-Passenger Car

Except for Power Plant, Chassis Follows Conventional Gasoline Car Design. Boiler Said to Be Long Lived. Engine Has Only Seventeen Moving Parts

ONE of the recent additions to the automotive field is the American Steamer, a steam propelled car which has been under development for a long time and which is about to be placed in active production by the American Steam Truck Co., Chicago. Outwardly the car has the same appearance as the conventional gasoline car. Likewise, the major units, such as engine, rear axle and propeller shaft are laid out in the same manner as the gasoline car.

In general, the car has a 121 in. wheel base, 33x4 Goodyear tires, three-quarter floating rear axle and is fitted with a five passenger body. It is to sell for \$1650. The engine is a two cylinder compound double acting type, using high pressure superheated steam. The car has a speed of 30 m.p.h. with the engine turning 500 r.p.m. The maximum speed is around 65 m.p.h. The steam consumption is 12 lbs. per horse power per hour. The engine has 17 moving units and, it is stated, the boiler will produce steam in 2 minutes.

The boiler is of the water tube type made in sections and located under the hood. It is built of cold drawn seamless steel tubing and has a heating surface of 150 sq. ft. It is tested to 4000 lbs. pressure per sq. in. and cut off at 600 lbs. pressure. The circulation in this boiler is such that saturated steam or water is not pulled through to the throttle. It is said that overheating even to a red hot point many times will not develop leaks. The mud drum or ring is, below the rim of the fire pot and thus



Three quarter view of the American Steamer, which has all the characteristics of the gasoline driven car, save for the power plant. Enough water and fuel can be carried at one filling to run from 250 to 300 miles, it is stated

is not exposed to the fire. All oil and other foreign substances drop to this lower level, never more than 200 deg. hot and are blown off without incrusting on the inside of the tubes. The company states that boilers which have been used for three years show no scale.

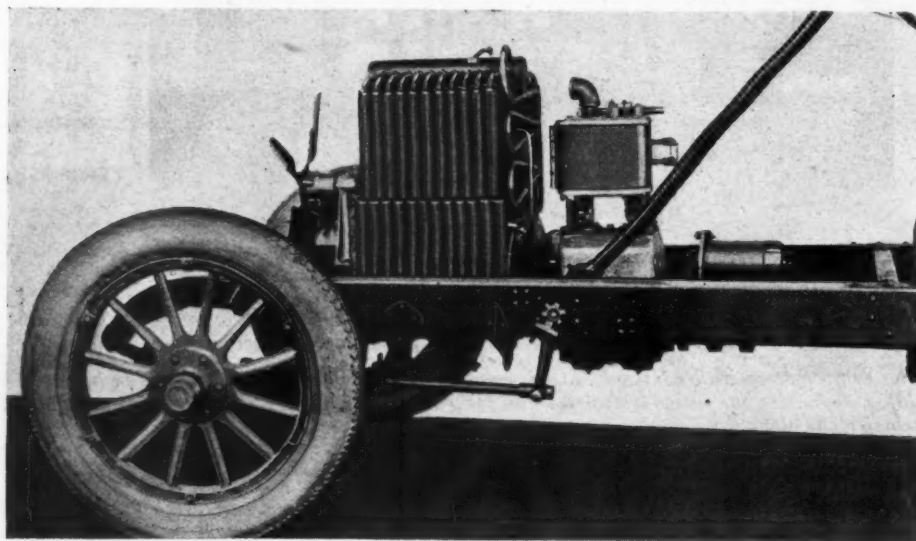
The engine has a piston valve and Joy valve gear in which the lead is not increased, as the distribution of steam to both ends of the cylinder on short cut off is more nearly equal. This valve gear also gives a rapid opening and

closing to the valve. An interesting feature of the engine is that the 2 or 3 qts. of lubricating oil in the crankcase require no change or addition in 3 or 4 months, it is stated. One filling of oil in the crankcase is said to be sufficient for 10,000 miles. The crankshaft is made of chrome nickel steel 2 1/8 in. in diameter. The cylinders are lubricated by a forced feed system. A convenient foot pedal "simples" the engine to increase its horse power.

The pumps are located under the foot board in a special unit driven from the main shaft by a flexible coupling. In all there are three pumps, one feeding the boiler with water, one drawing water back from the condenser to the supply tank and the third pumping fuel to the pressure tank. These pumps operate at all times while the engine is running. All are of the plunger type and operate at one-half engine speed.

The condenser very much resembles the radiator of a gasoline propelled car. Steam from the exhaust of the engine enters the top of the condenser and is turned into water by the time it reaches the bottom. The condensation is aided by a fan. The pump which draws the water back from the condenser has sufficient capacity to create a slight vacuum in the condenser. This has the advantage of letting the steam pass more quickly through the condenser and relieves the low pressure cylinder in the engine of atmospheric back pressure.

The need of precaution against freez-



This shows the arrangement of boiler and engine in the chassis. It also shows the generator which is driven by chain from the drive shaft. The steering gear is conventionally placed

ing is not so great in the American steamer as with the average gasoline car, it is stated. There is no water in the radiator nor engine jackets. Exposed water pipes are well insulated. The stored up heat in the fire pot, together with the warm water in the boiler and the fact that the boiler and fire pot are contained in a thick insulated shell, make it safe for upwards of 24 hrs., the company claims.

The burner is an automatizing type. Fuel is pumped from the supply tank under high pressure to a pressure tank by the plunger pump previously referred to. A single fuel line leads from the pressure tank to a conduit about 4 in. in diameter which enters at an angle the refractory-lined circular fire pot, which is over 2 ft. in diameter and 14 in. in depth. At the end of the fuel line is a single hole nozzle located in the conduit about 6 to 8 in. back from the fire pot. In front of the nozzle is the electrical igniting device. There is no pilot light.

Opening the control valve at the dash

completes an electrical contact to the igniting device, turns on the fuel and the flame circles around the fire pot. The nozzle is thus out of the flame and heat and is not troubled by clogging or soot. The pressure under which the fuel is carried provides the chief force or blast which propels the circular motion of the fire, however, at the other end of the conduit is a very light duty motor which brings air forward into the fire pot in order to supply sufficient oxygen to make perfect combustion. Viscosity of fuel whether kerosene, distillate or fuel oil, makes no difference in the burner and the apparatus will handle the fuel changes without calling for readjustment.

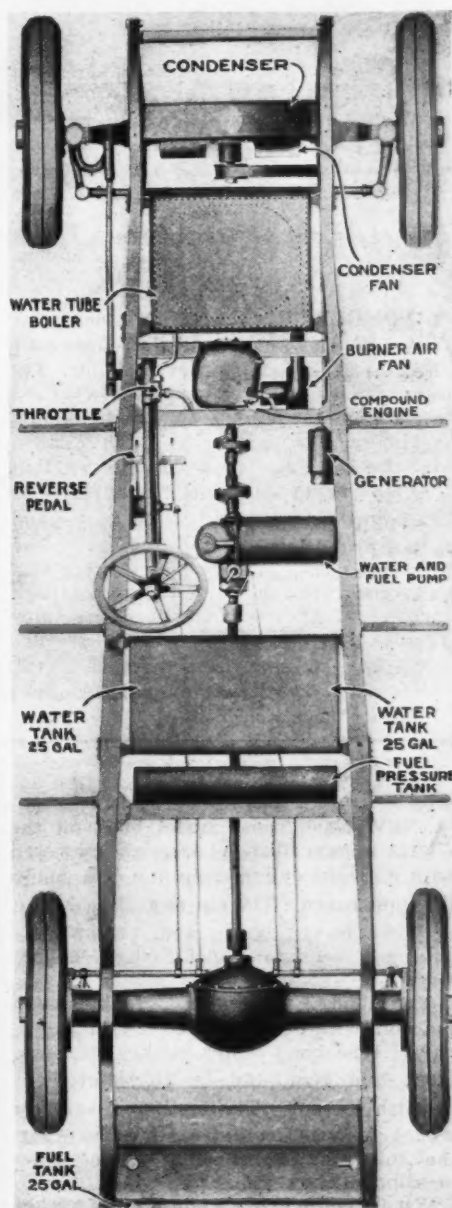
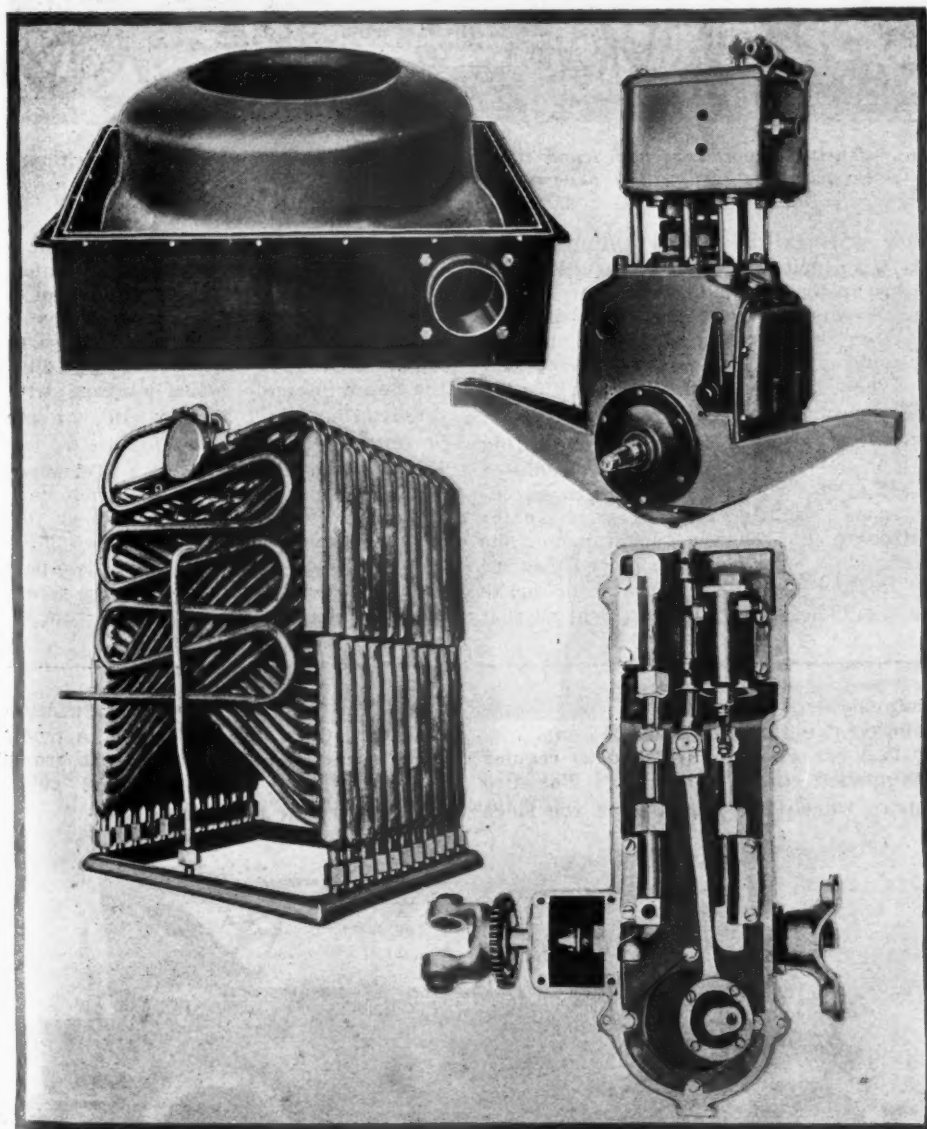
The water tank is located under the front seat and has a capacity of 25 gal. sufficient for a range of 250 to 300 miles. The fuel tank is located at the rear of the chassis and has a 25 gal. capacity. An indicator gage on the instrument board shows the amount of its contents.

The chassis has a channel steel frame carried on semi-elliptic springs, front and

rear, the former being 40 by 2 in. and the later 54 by 2½ in. The front axle is of the conventional I-beam type fitted with tapered roller bearings. The rear axle has a gear ratio of 1¾ to 1. Brakes are located on the rear wheels and are of the internal expanding and external contracting type.

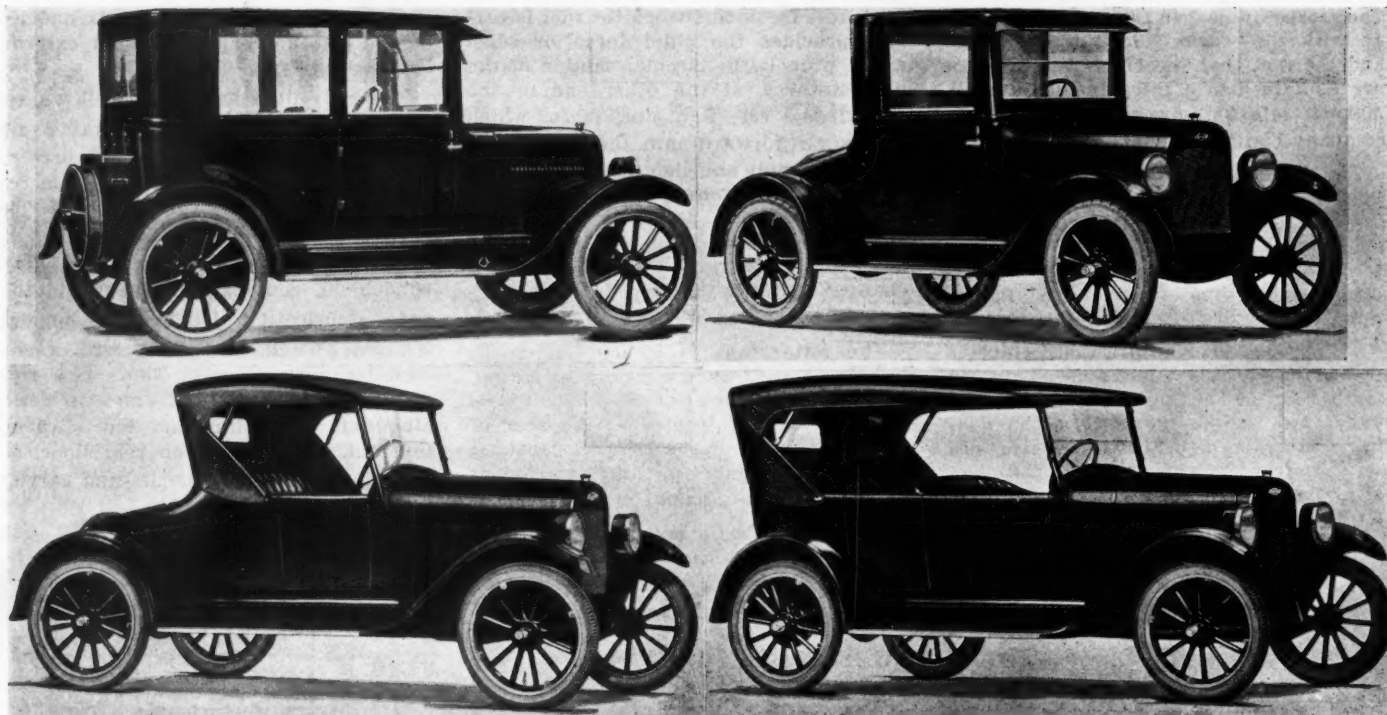
The body lines have been well worked out to present a good appearance and individual aluminum steps are used in place of running boards. The electric system includes a 12-volt generator. The battery is an Exide.

Equipment includes a single glass windshield, combination steam and fuel gages, lubricating oil gage, speedometer, ignition switch, and light with reeled cord for portable use. There is a robe rail on the back of the front seat, heavy aluminum bound linoleum floor covering in front, thick carpet on rear floor, set of tools, extra wheel or rim and carrier.



Some details of the American Steamer. Upper left, the burner or fire pot. Right—the two-cylinder engine, showing compact design. Below, to left, is the water tube boiler, showing mud ring at bottom. Right, sectional view of the water pump. The chassis view gives a good idea of the disposition of the various units

Chevrolet Improves Body Lines



Four of the new Chevrolet bodies. Top left, the sedanette, a sport type with trunk at rear. Top right, the two-passenger Utility Coupe. Below are the two-passenger roadster and five-passenger phaeton

A NUMBER of changes in appearance and a few mechanical refinements characterize the 1923 Chevrolet line. The foundation for the appearance changes is an increase of 4% in. in the height of the radiator. It is 1 3/4 in. narrower and the shell has been changed so that the top corners are more square. The headlamps are now drum type and fastened directly to the fenders. The fenders are all entirely new design with full crown and a narrower panel than formerly. The rear fenders are now flared at the back. All closed cars are equipped with sun visors of black metal.

Mechanical changes include more flex-

ible springs the quarter-elliptic being retained but now single curved downward instead of double curve, necessitating greater clearance between body and axle. This has been accomplished by raising the rear of the car. The springs are now fastened to the frame with open brackets making spring end easier of access. Vacuum feed is now supplied on all models instead of only in the closed cars. The wheel hubs have been increased slightly in size for greater strength and better appearance. The gear shift lever has been moved forward 6 in. and placed in front of the brake lever. The shifter lever is bent so that

the driver's hand will not touch dash.

The equipment changes include Holley carburetor on part of the line instead of only the Zenith as formerly. This is simply done to provide two sources of supply for increased production schedule, the same practice being followed with the ignition which is now either Remy or Auto-lite. All of the closed cars are Fisher Body products with Ternstedt regulators on the plate glass windows.

The new Chevrolet prices are as follows: Two-passenger roadster, \$510; five-passenger phaeton, \$525; two-passenger coupe, \$680; five-passenger sedan, \$860 and the superior sedanette, \$850.

Nash Sport Model

A NEW Nash sport model built on the 121 in. wheelbase chassis and powered with the six cylinder engine has made its appearance. The car is designed with a low hung body and, completely equipped, sells for \$1645 f.o.b. Kenosha, Wis.

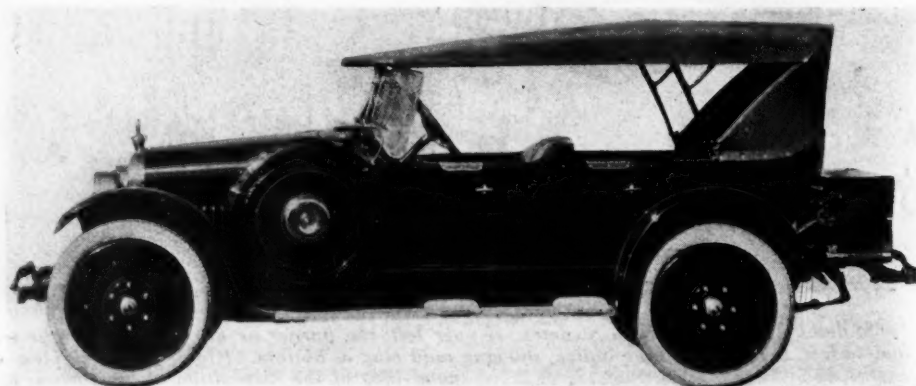
The body is finished in a deep maroon, with ecru top, nickel trimmings, barrel type head lamps, nickel bumpers, front and rear and is upholstered in Spanish leather. The equipment of this model is very complete and takes in the following items aside from those mentioned above:

Windshield wings, spotlight, nickel plated radiator shell, cowl ventilator, locking type radiator cap with motometer, mirror, windshield cleaner, alu-

minum steps, nickel plated cowl lamps and combination stop and tail lamp.

Disk wheels are furnished as regular equipment, there being six. The two spare wheels are mounted on the sides

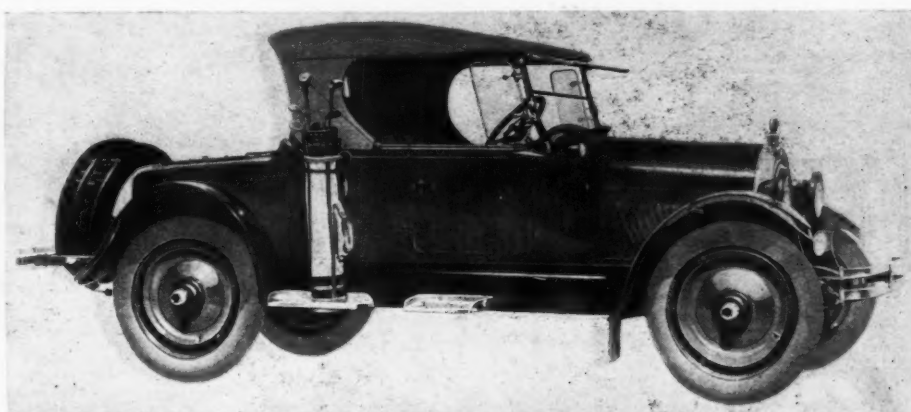
of the car. The extra wheels are fitted with cord tires and tire covers. A trunk rack is carried at the rear, with trunk and waterproof cover. Vertical guide bars protect the rear of the body.



New Sport Roadster Added to Olds Line

A SPORT roadster, mounted on the light eight chassis, has been added to the 1923 Oldsmobile models. This new car will sell at \$1625. The body is finished in a new shade of green, with nickel trimmings, and vertical nickel rails on the rear deck. Disc wheels are used, cowl lights and a cowl ventilator also are furnished. Standard equipment will include windshield wings, spot light mounted under the left front headlight, aluminum steps, stop and parking light, cigar lighter, bumpers, windshield visor, double tire carrier, motometer and a nickel windshield wiper.

An entirely new feature of this car is a rack, mounted at the rear of the right hand step, for the carrying of a golf bag, and lights set in each door, which automatically light when the door is open and serve to illuminate the steps and interior of the car at night. These lights are operated from switches set in the

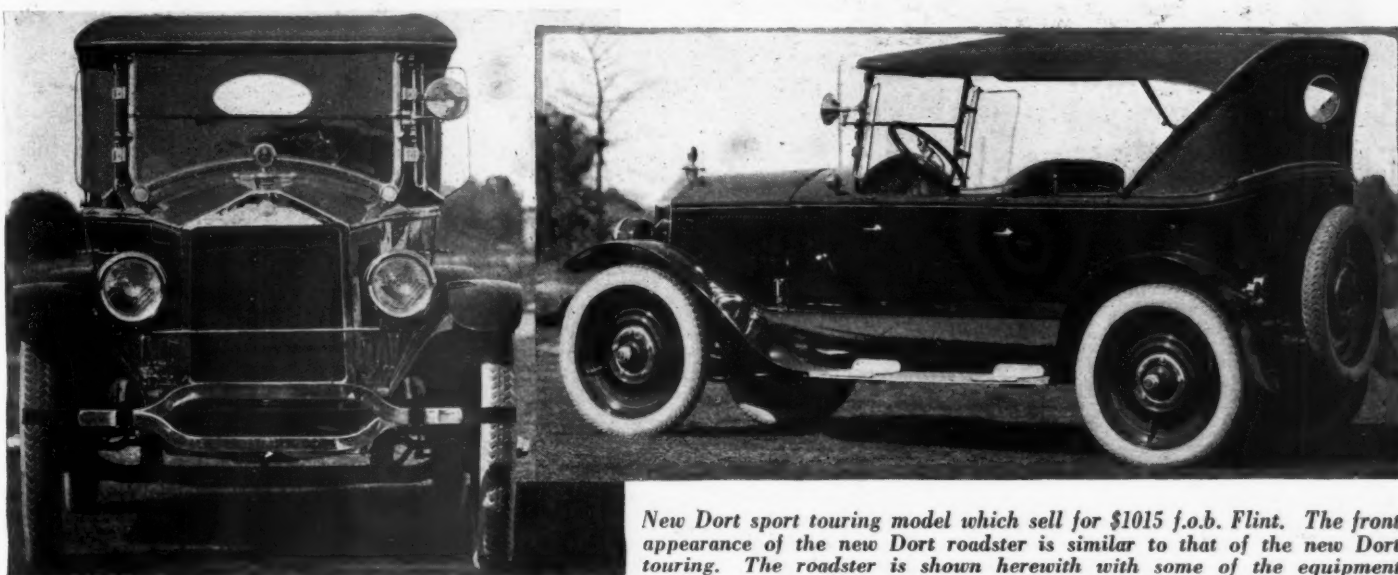


door jamb, which automatically shut the light off the minute the doors are closed.

A large rear deck door has been adopted with pockets in the under side of the door, where tools and small articles may be carried. In addition to this the entire space under the rear deck has

been made roomy and has been finished in leather, leaving ample room for two suitcases or a small trunk, and at the same time providing a clean space where clothes and lunches may be carried. A non-fading Burbank top, of imported material, is used.

Dort Adds Two Sport Models



New Dort sport touring model which sell for \$1015 f.o.b. Flint. The front appearance of the new Dort roadster is similar to that of the new Dort touring. The roadster is shown herewith with some of the equipment standard on this sport model

THE Dort Motor Car Co. has added two new sport models, a phaeton and a roadster. Both are mounted on the standard chassis. The cars list for \$1015 f. o. b. factory and are trimmed in accordance with sport fashion. The cars are finished in maroon with aluminum strips, the upholstery being genuine leather with a mottled hand finish. The top and side curtains are khaki. The rear windows are of rock crystal glass $\frac{1}{8}$ in. thick.

In the equipment furnished with this car, nickel plating is used for the drum type headlamps, cowl light, spot light, combination spot and tail light, as well as the bumpers. The motometer is fitted with a key locking device and the wind-

shield is equipped with side wings and wiper.

KARDEX MAKES DEBUT

The Kardex System of business control for the automotive dealer was recently placed on the market by the Kardex Co. of Tonawanda, N. Y. The first offering of the new business system is in the Kardex Master Business Control for Ford dealers. Compiled by A. G. McMillan, the Ford plan is offered with the view of helping the dealer with his systematizing problems and to enable him to better know each department of his work.

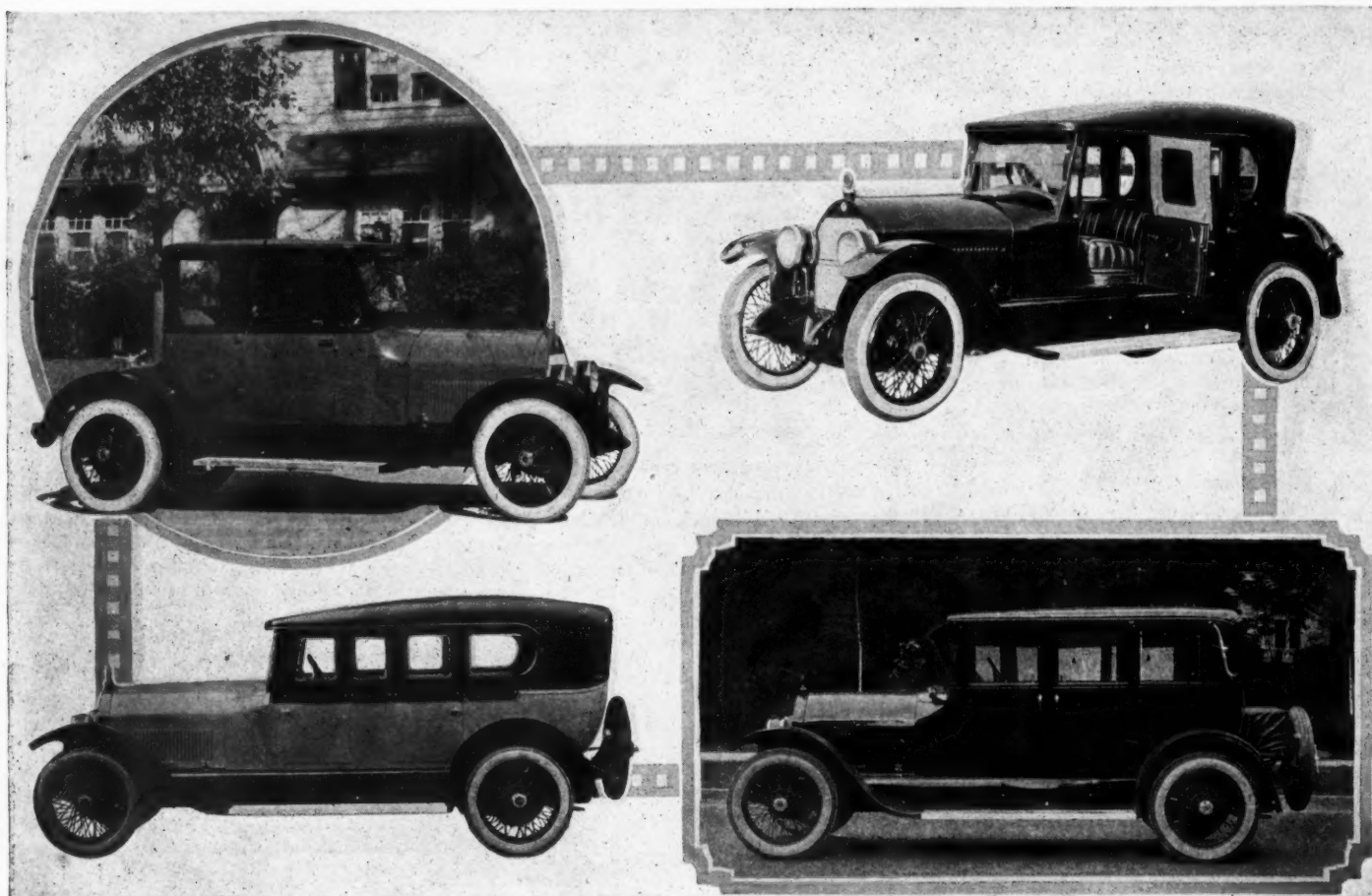
The Kardex company is the manufacturer of the "visible record files" and

the introduction of the automotive file is commented upon in a letter from the company as follows:

"One of the features of these automotive Kardex systems is the complete sales prospect file, which goes with each unit. This prospect file is so complete in itself as to instantly tell the sales prospectus of an organization. By glancing at the sales prospect file the sales manager can immediately analyze the effort put in by each salesman and his progress made from day to day.

"Following the completion of the Master Business Control for Ford Dealers a specialized system for each and every class of automobile dealers in the country will be developed."

Stutz Has Complete Line of Fall and Winter Models



THE Stutz Motor Car Co. has a complete line of cars for fall and winter. The line includes four models, all especially adapted to use at these two seasons of the year. A five passenger custom-built sport sedan is an entirely new departure. This equipage is built only on special order, and is of an exclusive Stutz design.

The four-passenger sport coupe is

another distinctive creation. The body is of aluminum throughout and the interior appointments and refinements are of the discriminating sort. It is intended to provide all of the characteristics required by the tourist as well as the comfort of the town car.

A four and a seven-passenger California topped model complete the Stutz line.

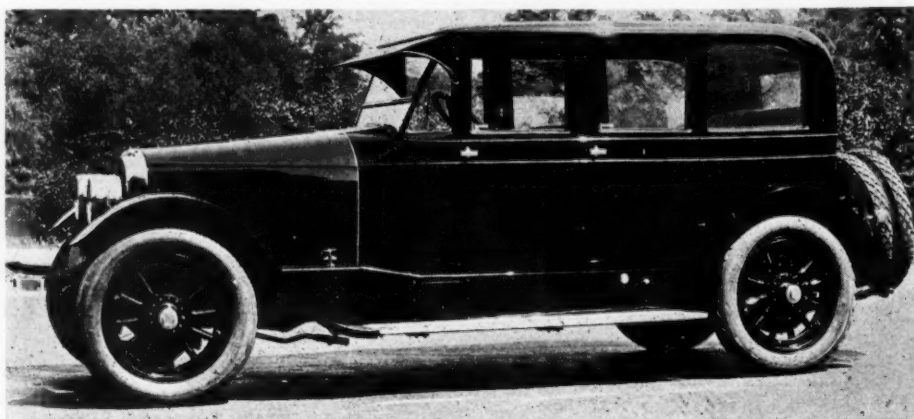
All Stutz models are offered in a wide variety of color combinations, enabling the exercise of personal taste in their appointment and finish. The prices follow: Sport sedan (custom-built), \$4450; sport coupe, \$3490; four-passenger California top, \$3165; seven-passenger California top, \$3015. All prices quoted are f.o.b. Indianapolis.

New Dorris Four-Door Custom-Built Sedan

A FOUR-PASSENGER, four-door custom-built sedan is being brought out by the Dorris Motor Car Co. This sedan is of unusual design, the coach work being that of the Hume Body Corp., of Boston. It is a type of car designed and fitted for touring.

The upper body panels are finished in black while the lower panels are in a harmonizing color. Two strips of molding, one of which extends around the body and the other over the hood, are finished in the color of their respective panels. A nickel plated radiator shell, two large nickel barrel headlights and a nickel plated rear light, of the same pattern, add to the appearance. A tire carrier, mounted on the frame in the rear, is designed to carry two tires.

The glass in all four doors lowers flush with the window sill. A genuine black walnut panel inside the doors just below the window opening adds greatly to the finish and attractiveness of the



interior. The instrument board is black walnut. Two lockers of the same wood are conveniently placed on each side of the cowl below the instrument board. An easily removable ash tray is provided on each side just above the lockers.

This car is low hung, a feature which

adds to its riding qualities,—but still there is plenty of head room. Seats are low and comfortable with deep cushions. The upholstery is of gray motor cloth, selected because of its wearing qualities, and color, making a very practical interior for touring use.

Some Things the Small Dealer Can Learn From Hasting & Williams Maintenance Department

Equipment is Just as Necessary in the Small Shop as in the Larger One. If the Large Shop Exercises Care in Fitting and Aligning, Why Not the Small Shop?

TOO often the dealer in the small town is apt to pass over an account of how some dealer in a large city is making good with the words, "Well, he's in a big city, got lots of money and can do those things."

Take equipment. Many small dealers say they cannot afford it. It's allright for the large town dealer who has a large volume of work and all that, but the small fellow can get along pretty well if he has one or two good men in the shop.

Well, here's a point. The readers will remember in the story about the Williams & Hastings maintenance department, published in the Oct. 5 issue of MOTOR AGE, that reference was made to two vises which were used for straightening and lining up front axles. The story in part said:

"At one extreme of the bench there are two heavy vises set with their jaws directly in line. These are lined up within .0001 in. These vises are for straightening front axles and the spacing between the vises is such that the jaws fit right under the spring pads of the axle. This results in a much more accurate job than can be performed at the average maintenance station."

We should like to ask if a maintenance department like that of Williams & Hastings sees fit to line up front axles, which have become sprung through accident or otherwise, by an efficient method which so far as outlay of money is concerned means practically on the buying of two good vises, why should not the small shop do the same thing? A good vise is essential. Another good vise would do no harm. So why not install them to handle front axle work and at the same time use them for other shop purposes? You will not always be straightening axles, but when the need arises you are all set to go ahead and do a good job of it.

If you studied the illustrations made from pictures taken in the shop of Williams & Hastings you will notice the sturdy bench construction. Take a look at these and then go out in your shop and size up your own. Note particularly that the bench pictured is clean. There is not a mess of tools and parts scattered over its top. The mechanic can work quickly and efficiently, knows where to find a part and cannot help but take pride in his work.

When business is a little dull in the small shop, then is the time to make certain shop fixtures which will come in

handy during rush periods. Williams & Hastings have made such fixtures and these are not beyond the possibilities of the small shop.

For example, a dummy flywheel can be made up for locating and checking work on the clutch housing, or some similar operation. Also, a dummy rear wheel brake drum comes in handy for relining bands, burning them in and other operations which require checking against a master drum.

The Small Shop Can—

- 1—Install a workbench that is sturdy and built for making it easier to perform the daily shop tasks.
- 2—Make special equipment, like a dummy brake drum fixture for relining brake bands.
- 3—Build small trucks for transporting heavy equipment without wasting human energy.
- 4—Put in an oil dispensing method that will prevent waste of oil.
- 5—Build a tool rack for reamers and other expensive tools to prevent breakage, rust or loss.
- 6—Record the operations and tools required for any certain job to save mechanic's time.

Lining up the front wheels is a job which has to be done very often in a maintenance department, large or small. Usually the shop uses some sort of alignment gage or trammel. But how many shops check the gage for accuracy? The story in the Oct. 5 issue told of how this is done in Williams & Hastings' shop. Thus, before passing out the tool or fixture, the tool room keeper can check its alignment very quickly. He also can check it when it is returned. This checks not only the tool but also the work performed by it, always insuring a standard of accuracy.

Mention is also made of a cylinder re boring machine which has been made easier to handle by mounting the tool box on casters. Thus the tool can be rolled up to the job in the box without forcing the mechanic to carry a heavy load. This is something which can be applied to various other pieces of equipment in the shop, such as the welding outfit and oil dispensing tanks. We have seen little trucks built to move one or two storage batteries about the shop. Anything to conserve human energy in the shop is good practice.

The method of keeping reamers in the shop of Williams & Hastings is some-

thing worth the attention of all shop operators. Damage to reamers, as from rust, for example, runs into considerable money, and, therefore their proper protection while not in use is essential. In the shop mentioned the reamers are kept in grooves cut into wood shelves. By pouring oil on the top shelf all reamers are kept immersed in the oil which flows by gravity to a trough on the bottom shelf to a suitable drain. Certainly if this shop takes this trouble to protect its reamer equipment, the small shop can install some similar system at least to approximate it.

Cutting down leaks in the shop—that is something to which this shop has given much thought. In its oil dispensing method, for instance, the oil is fed under pressure to several convenient points in the building. The relief valve in the tool room is operated by the tool room keeper and his last job at night is to shut off the valve, which then automatically makes the drawing off of oil at any of the taps impossible. Not every dealer can put in such an elaborate system, but it is likely that he can see to it that steps are taken whereby every Tom, Dick and Harry cannot help themselves to the oil? Maybe it means putting simply a padlock on the oil drum. Anyway, the oil and greases must be watched, or there will be leaks that tap the shop profits.

The idea of placing cards stating the operations for a certain job and the tools required for it, in a pocket near the tool room makes it easy for the mechanics to tell the tool room keeper exactly what they want. It means saving time in going to and from the job because a certain tool might have been overlooked. The cards give complete instructions for the job in question and, in combination with the flat rate system have enabled the mechanics in this shop to average 90 cts. per hour on a piece work schedule.

The above idea is one that can be readily adopted in any small shop. The operation of taking out the clutch in a Runwell car, for instance, is the same in New York as in Cherry Valley, so why should not a dealer's shop in Cherry Valley list the operations and equipment needed for the job and thus save time in performing the job just as the Runwell shop does in New York?

We think every small town dealer should again read this article, in the Oct. 5 issue, and then see where he can apply the suggestions offered to his own shop.

The Fable of the Car Surgeon Who Learned Time Does Not Always Soften Sorrow

By TOM WILDER

With Apologies to George Ade

TOMPKINS had been Conducting a Sanitarium for Disabled Busses for a little over a year and had made Good as far as Craving the Hay at Curfew, being Rough with the Food, Raising Blisters and Razzing his Jeans; but when he came to Vise his accounts he could discern, without micrometers, that he was headed Down Grade with Smooth tread Tires and Slipping Brakes.

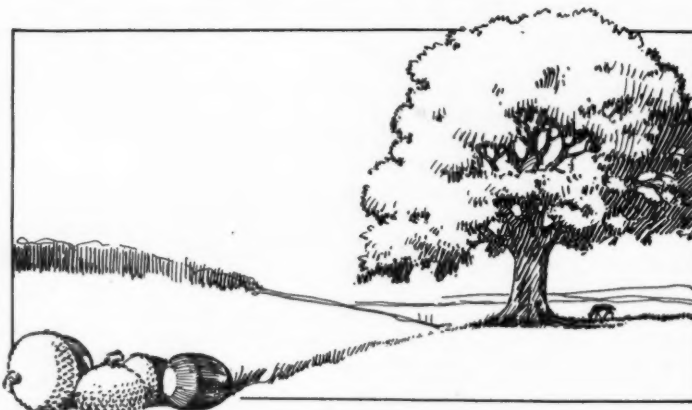
There were so many Birds in town that owed him money that he imagined the whole population was watching him so that it could slip down an alley if it saw him coming. Some of them he now knew to be Deadbeats, the kind who, if you stand them on their heads, nothing drops out of their pockets, while others meant Well but Couldn't.

There was Pete Hennesey. Pete had picked up an antideluvian Bunocomobile for a song and brought it into have it Overhauled. Tompkins had told Pete that the Rig wasn't worth the cost but Pete had an idea that a Bunco was good to the last inch so Tom (they called him Tom for short) went to work and finally made it run as well as it ever had.

The Bill almost Killed Hennesey, so while the Bus was Running Pretty he went out and sold it for enough to settle up with Tompkins and Come Clean. But it was the old story; a Friend, a couple of other Ginks, a Stranger, a drink of Moonshine and a chance to maybe double his money at the Cards. If the bill was ever paid Tompkins would have to go to Court and, knowing Hennesey, that was like using gasoline to put out fire.

Doc. Green, the Dentist was another Thorn in his Flesh. He had overhauled Doc's Old 4 cylinder Flappard to the tune of 210 Shimmers. New paint n'everything, but Doc was always broke like many good fellows and the Good Lord only knew when he would pay. Doc had offered to pay in Dental Service but Tompkins' teeth were sound enough to Bite off King Bolts without nicking, so it Didn't Mean Anything.

Next there was old Si Nichals out on the South turnpike about a mile. Si never did have much to spend on automobiles so like lots of other Tightwads he thought he could Beat the Game by picking up some old but good make of wagon that was all run down. He would buy it cheap and have it tuned up for about 50 dollars—"a few shill-



ings more or less wouldn't bother" Si.

He got it cheap all right but when he brought it to Tompkins to have it "Tuned Up" Tom laughed at him.

"The only way to tune up that engine," said Tom, "is to have it re-ground and fitted with oversize pistons. The valve stems are so loose that they will have to be bushed and the whole works are in proportion. The job will cost at least a hundred and fifty bucks, counting new bearings and parts necessary, after that it ought to be painted."

Old Si thought he was getting Spoofed so he Shopped Around a little only to find the Sad Tale was even More than True, so he came back and told Tompkins to go ahead and let him down as easy as he could.

Si was all right and was Ticked Pink with the job. It buzzed along like a piece of Si's salt pork frying in batter and had more pep on the hills than a Yearling Colt. But lightning struck Si's barn which was only half Covered and Tom would have to wait for another harvest before he got his Coin. He was out the Regrinding charges and it might be a bad year besides.

Jobs of this kind didn't make the future look very Rosy so he decided to try the Cash and Carry plan. If the customer didn't Come Across with the Cash Tompkins would Carry the Car till he did.

This looked business-like but after making a collection of half a dozen cars he began to be called Shylock and My Uncle, to say nothing of Robber, Cut-throat and Crook. People who had money to pay got the idea from the circulating gossip that Tom was a hold-up—that he overcharged about 50 per cent and then held the car if customer couldn't Kick-In.

This was hard on Tompkins, for while it put the Half Nelson on the Deadbeats, they set up such a Clack that the good

trade began to Shy.

While studying his books at night to see where he could Freeze Onto his next payroll he made the startling discovery that all the bad accounts were big jobs—75 Beans or over; that while smaller charges were sometimes Slow they always Came Through and were the real Revenue that Fed the Works.

"Great Oaks from little Acorns Grow"—them's the Sentiments.

"Little drops of water, little grains of sand, Make the mighty ocean and the happy land"—that's the Dope.

"The Woolworth Millions were not collected in Large Gobs but in Dimes and Jitneys; Two Bit pieces were too large"—more True Words.

"Some of our most successful Get Rich Quick Experts are now on the rock pile making big ones into little ones"—More proof that it is best to proceed in Small Doses rather than take the Whole Bottle. Then and there Tompkins made a Solemn vow that there "wouldn't be no more" big jobs.

If he had fixed up Si Nichal's engine only Si would have been just as well satisfied, the job would have been paid for



long ago and Si would have been back to have something else done.

In the past he had been Stuck On his salesmanship, thinking himself quite a Whirlwind; Now he realized that it would be no achievement for him to sell an Upstate Hick the Statute of Liberty if he couldn't get his Mitts on the Jack. A real Salesman must use discretion in making Sales to avoid Overloading a customer or selling him more than he could pay for.

It would be better to err on the side of Safety, Sell a Man less and leave him with an Appetite for more even though everything indicated his ability to pay for all he wished. Si Nichols, for example, was a prosperous farmer but even prosperous farmers often have to be carried till crops are moved. Better to be Safe than Sorry.

From that time on Tompkins began to improve his Balance, for the Red Ink gradually disappeared from his books.

When a customer of doubtful Credit came in with a bad case of Worn-outness and wished to have it Dipped in the Fountain of Youth, Tomkins got out his pencil and began to make rough estimates of the cost.

Usually if he was well acquainted with the Customer, and sometimes whether he was or not, he would say, "Steve, don't you think you are making a mistake in Sinking so much Coin in this old Bus? Of course, I could go the Limit, regrind the cylinders, put in oversized pistons with patent rings, bush the valve stems and give'r some new bearings all around but that wouldn't increase the Market Value much as long as those fenders are all battered up and the body needs paint.

"First thing you know you will be selling 'er or trading-in for a new one and you will be In the Hole the cost of the repairs. Suppose I tighten up the running gear and the engine bearings, grind and adjust the valves, take up the looseness wherever it can be done by adjustment. That will mak'er travel pretty well for six months—maybe a year. When that's done if you want to Doll Her Up some more, either to sell or for your own satisfaction, we can giv'r a coat of paint.

"Next spring, if you decide to run'er another year, it would pay to grind and put in new pistons—probably pay for the job in gas and oil. Of course, I could, as I said before, go ahead and make a new car of the Old Rascal but I know from experience that the cost would spoil the pleasure you would get out of it. I want you to get the most satisfaction that you can for your money. There is another angle too; if you have such a big bill to pay you will let'er get all run down again before you come in and a car lasts longer and runs better if it is kept in tune."

With this kind of a line of conscientious Sidestepping he would lead the customer to believe that he was working solely in his interest while as a matter of fact Tom was looking out for Tomp-



kins and the Jack that would be due him.

Sometimes it was necessary to claim that the shop was too busy to take a large job and get it out promptly but would do part of it and the rest a little later when there was less rush (really when the first part had been paid for) and better opportunity to do it right. It was a conspicuous fact that a customer seldom came back for the second part till the first was paid for.

When some Bird with an Antiquated



23 Years Ago This Week In Motor Age

David Starr Jordan Describes Hill Climb

A leading article quotes Dr. David Starr Jordan, president of Stanford University, describing a trip in an Elliott gasoline automobile to the summit of Mount Hamilton, 4120 feet above the city of San Jose, Cal. The following is a quotation:

"We left San Jose at noon on Wednesday. Through the crowded streets Mr. Elliott moved slowly and carefully, but along Santa Clara street, when not obstructed by teams, we were able to fly along at the rate of 12 to 18 miles an hour. On the heavy grades of Mount Hamilton we made about four miles an hour, and toward the top but three. The engine is sensitive to grade and dust, and on very heavy grades she kicks stoutly with her 'hind legs.'"

An automobile belonging to the Illinois Electric Vehicle Transportation Co. fell into the cellar opening in front of the company's stables, 173 Michigan avenue, Chicago, last week and there it stuck for several hours, for it weighed three tons

Chariot Rolled in to Pick Off an extensive job of rejuvenating he was turned down flat. Reasons—hard or impossible to get parts—too great a chance of loss from breakage—cost too great in proportion to the value of the car after overhauling—too much grief for the mechanics.

Occasionally some sentimental Old Woman, who had been driving his first car for the last 8 or 10 years and expected to drive it till he went over the bank of the River Styx, would insist on being overhauled. In such cases, Tomkins made a definite agreement of about 30 per cent in advance and the balance when the job was delivered, owner to furnish all new parts whether broken in repair or worn out.

So Tompkins learned that a big business need not be made by Big Deals. The Manufacturer of the Cheapest Car makes the most money. A small Bird in the hand is better than a Wild Turkey in the Bush.

Anyway, Tompkins' business began to improve and he found that it was much better to have a lot of Birds after him to do small jobs than to have perhaps the same Birds slipping across the street when they saw him coming.

Moral—It's sometimes better to Make Big Ones out of Little Ones.

and was wedged in such a way that it took a good sized derrick to pull it out.

The Doc's Car Won

A page and a half are devoted to a description of a race at Galesburg, Ill., on Oct. 4, 1899, between a Winton automobile owned by Dr. E. V. Morris of Galesburg and a Duryea automobile owned by F. D. Snow of Wyoming, Ill. The Duryea vehicle was three years old and the Winton was a new car. The race was to have been 50 miles, but at the end of 15 miles the Duryea car became disabled and stopped, the race and a \$2,000 prize going to Dr. Morris by forfeiture. The 15 miles was made by the winner in 42 minutes 18 seconds.

Minor Mention

The projected motor vehicle exhibition in Charleston, S. C., has come to naught.

Charles E. Duryea of Peoria, Ill., is at work on a motor tandem to be used as a pacing machine. There will be no pedals, but a six h.p. 3-cylinder Duryea gas motor.

Correct Location of Brake Rod Centers on Cars Using the Hotchkiss Type of Drive

Rear Brake Lever Must Be In Proper Relative Position With Center of Rotation of Rear Axle Housing. A Method for Determining the True Angular Movement of Linkage

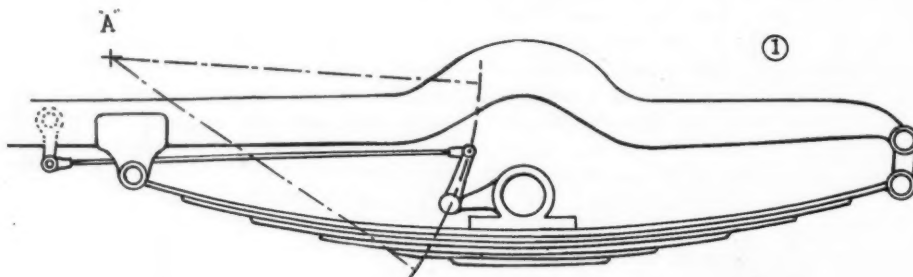
By A. H. PACKER

THE Hotchkiss type of drive, as shown in Fig. 1, is a construction with which we are all familiar, but trouble with the operation of brakes on many cars of this type would seem to indicate that not enough attention had been paid to the brake rod layout. As may be seen from the figure mentioned,

for which reason the axle brake lever at ward of its position at "A". Such a condition would have the effect of loosening

At "C" we have exactly the opposite condition where, with the car rolling backward, application of the brakes rocks the axle housing backward, and tightens the brakes. Such a car would

to which the brake rod attaches, is on the same level as the center about which the axle turns. Now, even with considerable angular motion in the axle housing, and a corresponding angular motion in the brake lever, there will be but little effect on the brake action, because the end of the lever will move chiefly in a vertical direction, with but little motion fore and aft. There will accordingly be practically no tendency to increase or decrease the tension exerted by the brake rod.



The curved dotted line indicates the arc of movement of the rear brake arm when the springs are deflected. The dotted lever attachment of the brake rod at front represents an average layout. It is seen that flattening of the spring from load or road deflection will move the rear brake lever backward thus applying the brake. The point marked "A" would be the ideal location for the location of the front lever as that position would be the center about which the arc of deflection is described

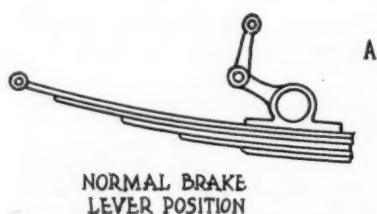
the spring is called upon to do three things. First, it supports the car. Second, it takes the torque strain produced by driving or braking. And third, by means of the support at its front end, it transmits the driving force from the rear axle to the car frame.

In Fig. 1, the brake rod has been laid out at random, which generally speaking results in trouble from two sources, one being the twisting action that takes place when the power is applied or the brakes are used, while the other trouble is due to the deflection under load. Considering first, the effect or torque we refer to Fig. 2 where, at "A", is shown the normal position of the spring and the rear brake lever mounted on the axle. A forward pull on this lever, as normally exerted by the brake rod, is used to operate the brakes, which tend to clamp the wheels to the axle.

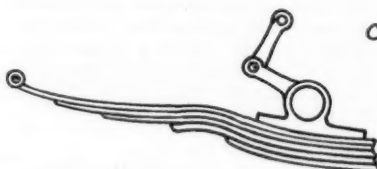
It is accordingly evident, as shown at "B", that if the car is traveling forward, and the brakes are applied, that the clamping action will tend to rotate the axle in the same direction that the wheels are moving. The center about which this turning movement takes place will not necessarily be the exact center of the axle, but will at least be near it,

"B" will have rotated to the left or for- be difficult to stop when going forward, but would stop with a jerk when going in the reverse direction.

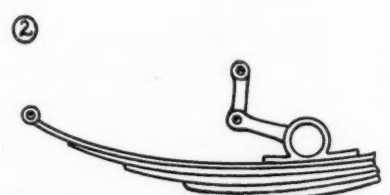
We will now assume that such an axle has been changed as shown at "D" so that the upper eye of the brake lever, the tension which the rod exerts on the lever, thereby loosening the brakes, and making it difficult to stop.



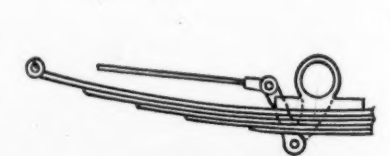
NORMAL BRAKE LEVER POSITION



BRAKES APPLIED WHILE MOVING BACKWARD



BRAKES APPLIED WHILE MOVING FORWARD



IMPROVED BRAKE LEVER POSITION

Correcting Faulty Location of Brake Lever on Axle

It should of course never be necessary for the maintenance station to change the location of the brake levers on the rear axle, but action of the brakes in grabbing, with the car going one way, and slipping with motion, in the reverse direction, would indicate that the design was not right in the first place.

One possible cause for such a condition would be the use of a standard axle, on which the brake lever location might have been laid out for an installation in which the spring was to be mounted on top of the axle. The car manufacturer, wishing to use a standard axle on which the price would be lower than on one of special design, might take this stock type and use it with the spring underneath instead of on top. If correct for one type of installation, it would then be wrong for the other.

The actual work of determining the correct location for the brake lever is considerable but the principle involved is quite simple. In actual practice it would be practically essential to have the body off, so that all parts of the chassis would be accessible. Some means would then have to be provided for twisting the axle housing in either direction, and this problem would have to be solved by the service foreman or superintendent.

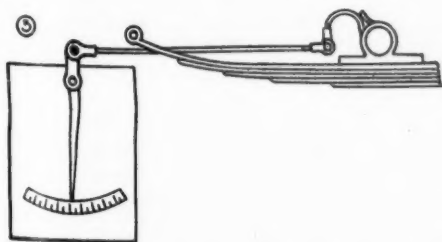
The next step would be to make up a fixture somewhat as shown in Fig. 3, the indicator mechanism being mounted on the frame so as to show variations in the rear brake lever position. A temporary support would now have to be attached to the axle so that the rear center location could be changed, and with this detail in readiness, the test could be started.

Locating of the right point for the rear support for the brake rod, would now consist in rocking the axle back and forth, and changing the position of the rear rod end, until a place is found where angular position of the axle, has practically no effect on the indicator. This would show that the center had been found, and the correct position of the lever would be such that its upper end would come at this point.

Even after the correct location had been found, a big problem would present itself as to a practical way of locating the levers at this point and it might be found easier to install a secondary system of levers, on the axle, which would receive the pull from the brake rods and transmit it to the levers actually operating the brakes.

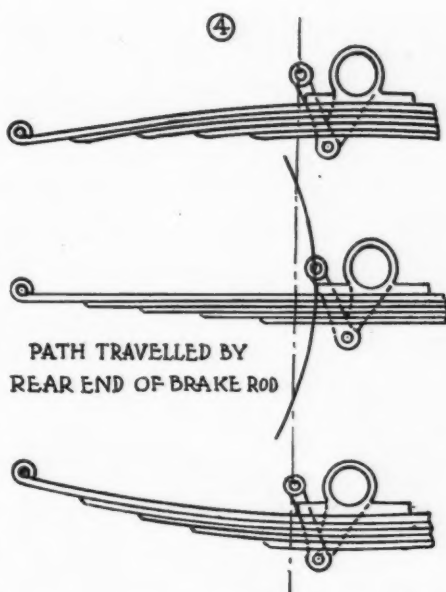
Correcting Faulty Location of Brake Shafts on Frame of Car

It is fortunate that trouble as described above is comparatively rare. There is another brake action difficulty, however which is somewhat more prevalent, this being due to the variation in the horizontal length of the spring as it deflects. In the construction shown in Fig. 1 it is evident that as the load on



A proposed method for determining the degree of elongation or compression of the brake rod with different lever mountings under varying spring deflection. Ideal location of the linkage is when the pointer has a minimum of motion over the graduated surface

the car increases, the spring will flatten out, and as the front end is fixed to the frame of the car, the effect will be to push the axle backward.



This condition is shown in more detail in Fig. 4, where the lower view represents the conditions of Fig. 1. We will now assume that the load on the car is increased until the spring is flat as shown in the center view, and that still further increase in load bends the spring in the reverse direction as shown in the upper view. With reference to the frame of the car, the rear axle and the brake rod attached thereto, will have traveled in a curve which is nearly a portion of a circle, and it is at the center of this circular arc that the front end of the brake rod should be located.

Considering again the sketch in Fig. 1, it will be seen that a curve has been shown which indicates the path travelled by the rear of the brake rod. If then the deflection of the spring is to have no effect on the brake action it is necessary that the front of the brake rod be located at "A" the center from which such an arc could be described. While the variation in distance between the theoretical center "A" and the front end of the brake rod has been purposely exaggerated, it is evident that with the conditions shown, flattening of the spring would tend to lengthen the brake rod, which would result in applying the brakes at every bump, or with increase in load carried by the car.

We may now, by reference to Fig. 1 and Fig. 4, draw some conclusions as to the faults that may exist in the brake rod layout, as determined by the symptoms.

If a heavy load makes the brakes drag, the front end of the brake rod is too low on the chassis, being below the theoretical center, or else it is in line with the center and the brake rod is too long.

Conversely, if the brakes are loose with a heavy load and difficult to apply, the front end of the brake rod is too high on the chassis or the rod is too short.

Practical Method of Checking for Center Location

As in the case of trouble first describ-

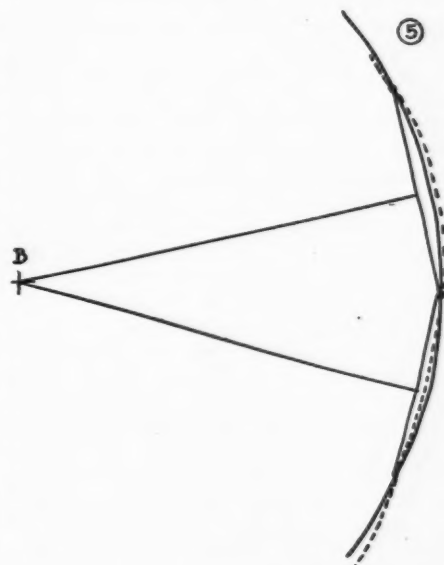
ed, the work would be greatly facilitated by having the body removed, although a check could be made with the body on, but with more difficulty.

The brake rod could be removed and a piece of pencil inserted in the brake lever on the rear axle, the lever being held securely so that there could be no motion with respect to the axle itself. A drawing board with paper attached should now be used in such a way that the pencil could trace a line on the paper, the board being rigidly attached to the frame of the car.

With the stage all set to get a record of the axle movement, the car could be gradually loaded to any desired extent, which should trace a curve on the paper, identical with the motion of the axle with respect to the frame. In this connection, we wish to point out that the drawing board should be so attached to the frame that it can be removed and replaced, in exactly the same position.

Referring now to Fig. 5, we will say that the dotted line represents the curve drawn on the board by the pencil held in the brake lever, and on this curve we will mark three points by dots as shown. Straight lines, as chords of the circle we intend to draw will now be made connecting these points, and from the center of these two chords we will draw perpendicular lines, which will meet at some point, "B".

With "B" as a center, we can now draw a portion of a circle through the three dots, and this circle will very nearly coincide with the curve shown dotted. "B" is then the center at which the front end of the brake rod should be located, and by again attaching the drawing board to the chassis, the proper place on the frame can be determined.

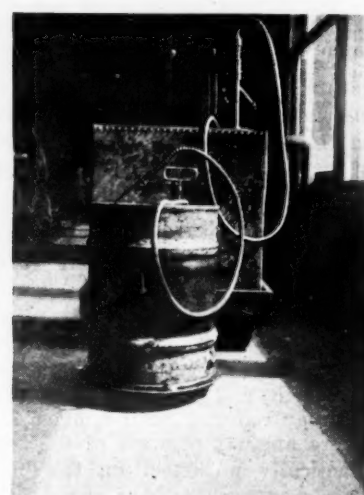
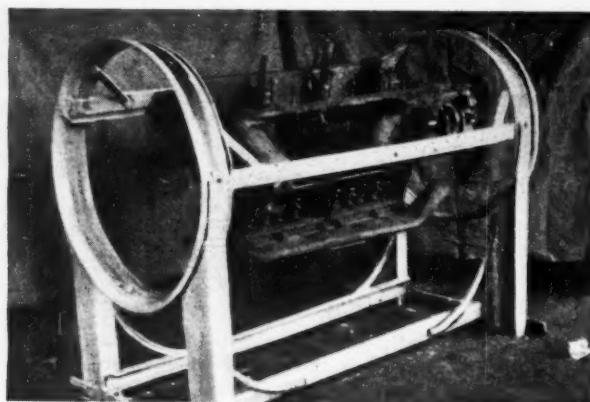


NOTE—The suggestion for this article came from a letter sent to the Motor Age clearing house, describing a condition on a car with this type of drive, where inequalities in the road would tighten the brakes.

The suggestions for correcting this condition were chiefly obtained by reference to an article by Walter C. Baker in the June, 1919, Journal of the Society of Automotive Engineers.

Making Maintenance Pay by Proper Angle of Approach

The Hudson-Brace Co. of Kansas City Has Solved Many Problems by Planning Things for the Best Interests of Car Owners. Idle Time in Shop Used Profitably



Left, oil service cart used in open court. Center, the revolving engine stand which speeds up work and conserves energy of men. Right, 15-gal. tank from which clutch oil is pumped direct to case. Measuring pump checks the amount used

THE attainment of the right "angle of approach" has solved many a problem for a motor car dealer, and has been the secret of his success. For instance:

The "angle of approach" of the Hudson-Brace Motor Co., Kansas City, Mo., to its sales and service subjects is, "How can we do this for the best interests of the car owners?" It works out—it has worked out—in dozens of specific instances, for the best interests of the company, too.

Follow a few of these instances, and you will catch the point. Some of them apply particularly to conditions such as the motor car industry has endured during the past few months; and are therefore of special value. Take the matter of economy in service department operation, as a very timely example. Every dealer has wanted to cut down his expenses, and has tried to do so. Most of them aimed at saving money.

The Hudson-Brace Company was eager enough to save money, too. But its first thought, from its "angle of approach," was, "How can we do this for the best interests of the car owner?" Economy might have been effected by reducing the working force; but many considerations prevented any drastic action in this direction—chief of which was the necessity for maintaining service to the car owner. From the Hudson-Brace "angle of approach," this matter of shop economy was considered with reference to the utilization of all the time of the employes profitably, for the benefit of the car owner.

At first blush, one might conclude that only so much time could be used, as was required for paid-for work waiting

to be done. Observe the Hudson-Brace practice "in action": Here were employes with some idle time; how could that time be made to serve the car owner? Obviously, it could be made to serve the car owner by having the men work on things that would make subsequent work quicker or better.

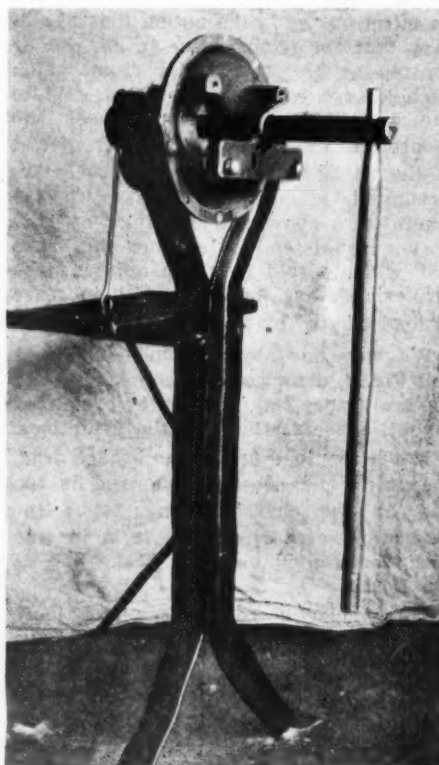
And that was the occupation of Hud-

son-Brace employes, in periods when work to be paid for was slack. They studied, discussed, thought out, and made, devices which would promote efficient operation, shorten the time on jobs, facilitate repairs or service. In three ways, this study and work have actually, in the past few weeks, benefited the car owner: First, by reducing time-cost of jobs; second, by cutting down the period during which cars are in the shop for service; and third, by producing better results.

There are literally scores of devices, pieces of equipment, tools, in the Hudson-Brace shops, designed by workmen to meet such special needs or promote efficiency in shop work—designed, and made by them, in their "idle" moments. And the wages paid the men for time spent on such work, are paying dividends to the company. Furthermore, the company has profited in the improved service—and—in the holding together of its splendid organization.

Among these devices are special wheel-pullers, a loose bar running through the core so that when the hammer taps it, there is no strain on screw threads; many special wrenches and frames for holding parts, devices for carrying oil.

And the equipment has practically all been made out of "scrap." Take the frame for holding an engine, as an example. There are several of these in the shop. The stand is made out of old pieces of angle iron; and is 4 ft. 8 in. long. The frame, in which the engine is carried, is made of tire rims which rest in grooves of the uprights of the stand, the rims connected by angle irons. On the connecting pieces are adapters at-



Differential work is made easier and more thorough by use of this stand

tached by bolts, so that any engine can be secured to the frame. As the rims are revolved on the stand, the engine is turned to any desired exposure for work. The stands are movable and light weight.

Then there are the stands for working on differentials. These are firmly bolted into the concrete floor. The I-beam of which each stand is made, is split at the bottom to form feet, and at the top to permit entrance of the differential. There are bolt holes in the flanges of the I-beam in the upper opening, to which the differential housing can be attached, firmly fixed there for heavy work.

Perhaps the most useful of the devices designed and made from "junk" are the oil carriers. Some of these carriers are small, carried by hand; others are provided with wheels. They serve two important functions. First, oil can be carried to the car—and to several cars, without refilling; second, they measure the oil as it is put into the car. Both of these functions save time, and add convenience—for the benefit of the owner.

The carrier for clutch oil represents the acme of efficiency with reference to oil service. In many shops, oil is kept in tanks; measured out of the tank, and the amount desired carried to the car for which it was drawn. Such a practice in handling clutch oil in this shop would involve also mixing engine oil and coal oil, either in the large tank, or in the small vessel in which it might be taken to the car. Each oiling uses one-half pint—obviously therefore there would be a disproportionate amount of labor and time involved in providing the clutch with oil.

It had been necessary, in oiling the Essex, to take up the floor board, and pour the oil, one-half pint of it, into the clutch. This new carrier consists of a 15-gallon can, in which is mixed clutch oil. Into this can has been fixed a tire



This company finds the open court to a ready means for handling the quick service jobs. The entrance to the court is shown at the right

pump, and the oil is pumped directly from the can into the clutch, without necessity for any displacement of interfering parts to reach the clutch. The pump measures exactly a half pint into the clutch. A screw has been fixed in the barrel of the pump, at the point figured out where it will cause the pump to exhaust exactly a half pint.

The same principle has been applied to other oil carriers, tire or other pumps being inserted into cans, or into larger tanks on wheels, and adjusted to pump desired amounts. Even small cans, to be carried around the shop or the open court service station, have been equipped with the pumps and measuring devices.

The most conspicuous improvement of Hudson-Brace service this year, has been the construction of an open-court service station, on ground owned by the company adjoining its sales and service plant. This, also, is a result of the thought of owners and employes, on the question, "How can we provide service for the best interests of the owner?"

A Trouble Shooting Movie

Seeking relief from the toils of the day, I dropped in at a moving picture house, followed the attendant down a dark aisle and worked my way past a portly gentleman with a protruding bay window to an available empty seat.

A melodramatic tale was being portrayed with the heroine in a National car, alone on a desolate road, the engine apparently on a strike for shorter hours or higher wages. Frantic inspection of the gasoline tank and radiator failed to reveal cause of the catastrophe, but, lo, a bright idea transforms her countenance as she digs under the front seat for the instruction book. Book opens at page 12, revealing complicated diagram of a Rayfield carburetor. Carburetor fades out and in its place is revealed the unintelligible figures of a Chinese laundry ticket and we gather that the director of the play means to imply that the young heroine does not fully understand the contents of said instruction book.

An enlightening statement now flashes on the screen, indicating a lapse of one hour, at the end of which time our youthful hero rolls along in a transformed flivver capable of breaking any and all speed records. Youthful hero lowers hood on right side of engine and raises hood on left, revealing Delco ignition unit. Hero takes one glance at Delco unit and asks for a manicure file. This is altogether too deep for the young lady in question, but having failed in an hour of more logical trouble shooting, she is willing to submit to anything.

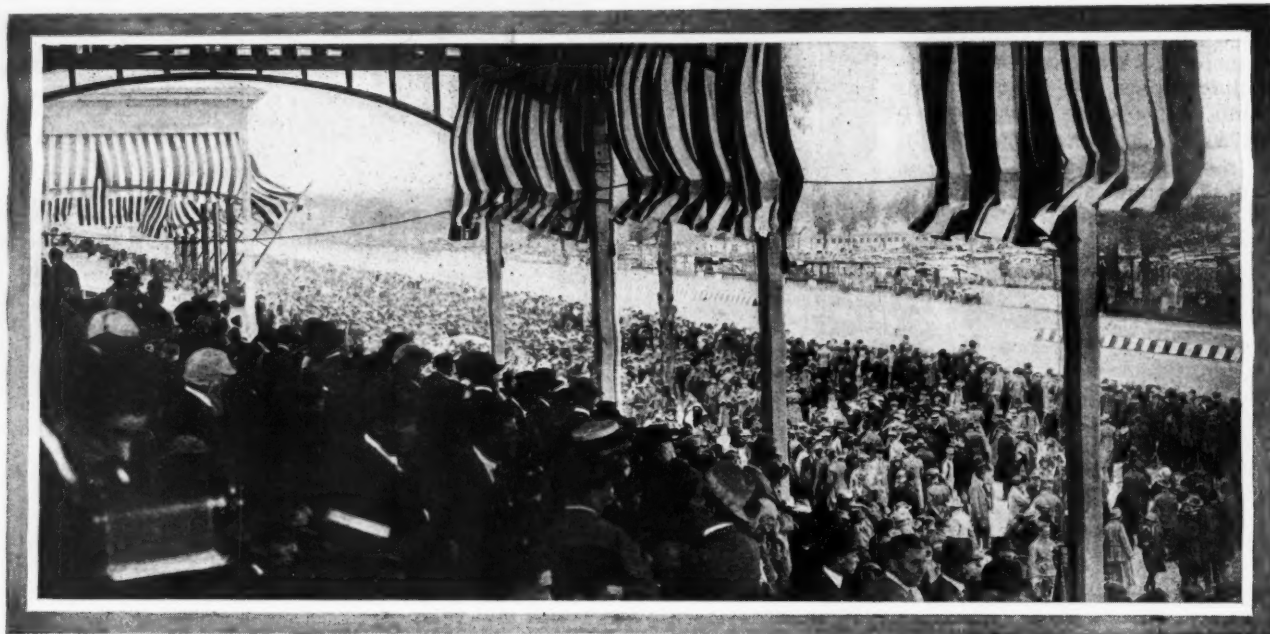
The requested file is located and after a few minutes' work, invisible to the audience, the young man clamps down the hood and tells the young lady to start the car. Operation of starter shows the engine again in normal condition, followed by much joy and gratification on both sides with a fade out that we refuse to describe in these columns.

Can any of you electrical experts tell what the young man wanted to do with the manicure file?

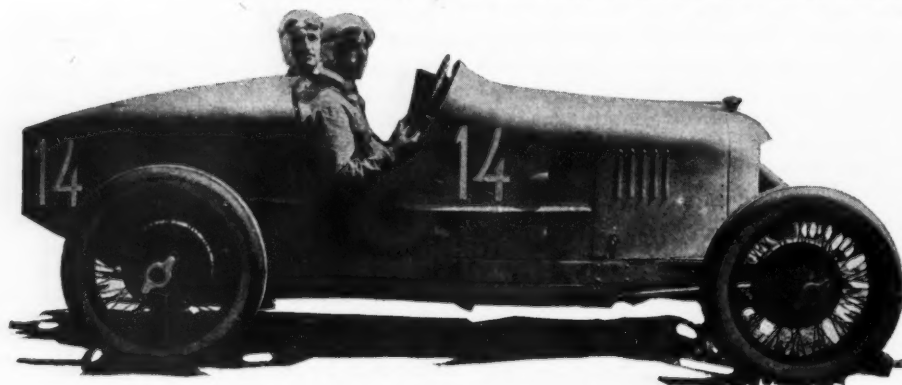


The shop of the Hudson-Brace Co. is tooled up to the last word. Each tool is designated by a number and in addition the name of the tool, indicating its use, is given

MOTOR AGE'S PICTURE PAGES



150,000 spectators crowded the stands at the Monza Speedway near Milan, Italy, during the 122 cu. in. Grand Prix at the opening of the new track. This was by far the largest crowd ever gathered at a European automobile race. The checkered line, seen on the driveway, divides the two courses of this double track



Enrico Giacione, one of the Fiat team in the Monza Speedway races, in a 91 cu. in. racer. In the 122 cu. in. race, Giacione broke his universal at the starting line, but in the shorter race he was the only driver who at any time passed Bordini, the winner



One of the German 122 cu. in. Heim racers, which competed in the recent Italian Grand Prix, at Monza. This was the first appearance of German racing cars since 1914

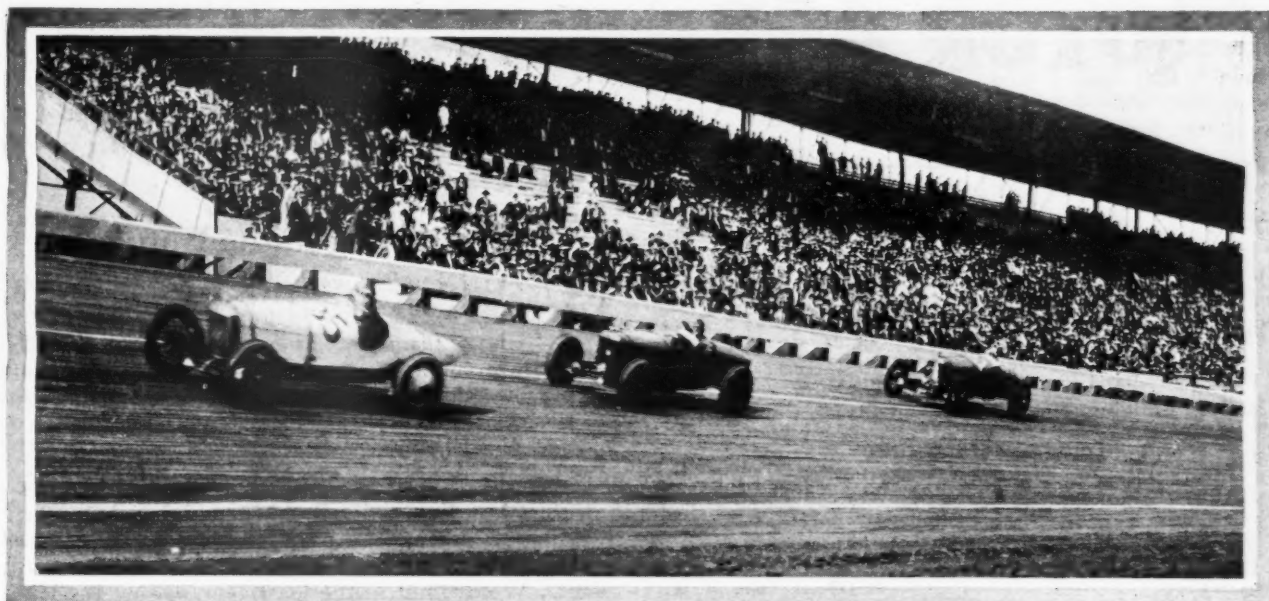


Where the two tracks of the Monza Speedway cross, a pump is placed at one side to keep the tunnel free of water. This photo was taken during the recent races and shows Nazzaro, of the Fiat team, on the lower track and Bordino, also of the Fiat team and winner of both races, on the upper track



Score Board at the Monza Speedway. The clock dial is used to show the time of the leader, throughout each race

OF AUTOMOTIVE INTEREST



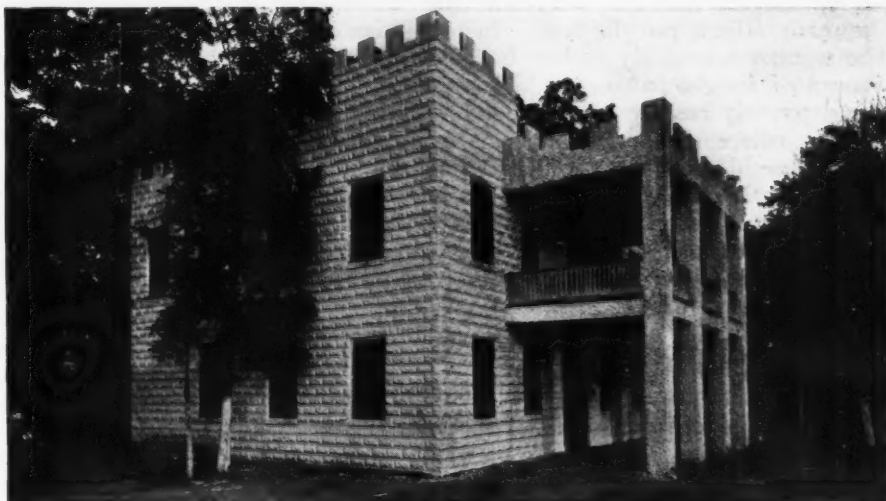
Tommy Milton, winner of the 300 mile race at the opening of the new Kansas City Speedway, passing the stands during the race. Milton drove a Leach special at an average speed of 103 miles an hour



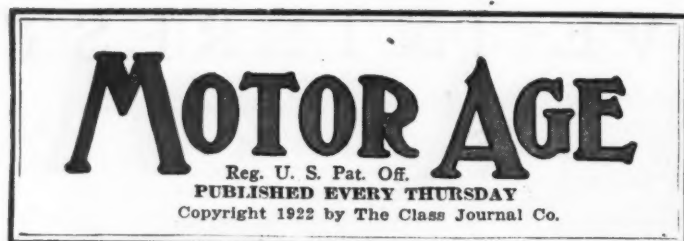
One of the last photographs taken of Smyrna before the great fire. Turkish cavalry are seen patrolling the waterfront, while Allied warships lie at anchor in the harbor, but more interesting to us is the Briscoe car in the foreground



Charles and Helen Polley, playing on the vaudeville circuit, find it cheaper to travel in their own bungalow motorcar than to pay high prices for railroad travel and hotel accommodations. They have travelled all over the country in this car, and their son, David, has never known any other home



Aqua Vista, new home of the Richmond, Va., Automotive Trade Association, is located on a bluff overlooking the James River, seven miles below Richmond. This building was made necessary by the rapidly increasing membership.



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What Is Honesty?

AN angry woman who came near buying an automobile says that she did not complete the deal because the dealer was not honest.

Her charge against this dealer was that the prices he put on the merchandise were not true prices. He had, like many others, put the f. o. b. factory price on the car. The woman was ready to buy but she refused when the amount of freight put on the bill amounted to more than it had recently cost her to ship her household goods from the city where the automobile was made to her present place of residence. She says that it is not in reason to think that the freight on an automobile would be more than on a carload of household goods. Also she was surprised that at the last moment a "war tax" charge was included. She had never heard of this feature, which is so familiar to most of us.

There is no evidence at hand to show whether or not this dealer was not entirely honest in the amount of freight he charged on that bill. Some dealers are very careful in this regard and some, apparently, are inclined to let the freight rates soar somewhat. The point is; this dealer was following a poor precedent in pricing his goods in a city several hundred miles away. What this customer wanted to know, and what every customer

really wants to know, is what will the car cost him here and now?

It is an interesting point sometimes as to what is honest and what is dishonest. But there is never any question as to whether an article should be priced at what it costs or some other figure.



Buying the used car right will make profits on the new car sales.



Looking to the Future

WITHIN a few weeks the voting will be over and a certain few favored men will be named as those who will make the new crop of laws for us. It is rather unfortunate that we must have new laws quite as often as we do, but as long as legislators are required by our basic laws to meet at certain times, they will get busy to show that they are earning their money.

Laws can and often do have a very considerable effect on business. Especially is this true when legislators seek to limit the use of any particular commodity, as witness the recent legislation against alcoholic beverages and their effect. We are not in the least fearful that the legislators next year will openly seek to bar the use of automotive vehicles, but in their lack of knowledge, some legislators are likely to do something that will have a serious effect.

So it is well for every dealer who is at all interested in the future of automotive vehicles to make the acquaintances of the legislative candidates in his community and sound them out on automotive topics. Ascertain whether these men are fair in their general attitude, or if they think that the automotive vehicle owners should build the roads and then maintain them at their own expense. Some legislators appear to think so. Also ascertain if the prospective legislator still thinks the automotive vehicle a toy. Some of them appear to think so.

Offer your services to this man as a guide in the deliberations as to the automotive vehicle. Tell him that the automotive industry asks only a fair deal. If he does not appear to be inclined to be fair on automotive subjects, organize a campaign and defeat him. The automotive industry and the automotive vehicle owners are the most powerful political group in this country today and they can get justice if they are properly organized. It might be well to remind the candidate that an anti-automotive man was defeated for the nomination for governor of California a few days ago by the automotive vote.

First reason, then use the big stick.



Why sympathize with a man who does not take the pains to collect for the merchandise he delivers?



As to the Winter

RECENTLY an "inquiring reporter" for a Chicago newspaper, asked five persons at a parking place if they were going to drive their cars this winter. All of the five were, and on a hurried reading of their replies there was nothing surprising in the answers. It was what an automobile man would expect.

All of the answers were apparently quoted verbatim and this gave to the replies an added interest. At least three of the five appeared to be surprised that such a question was asked. It was a matter of course with them that an automobile was an all year vehicle and some of them expressed a preference for the phaeton type, rather than an enclosed car, for winter.

Another interesting point as to the five cars concerned, was that each of them was chiefly a business vehicle. Each owner said that his volume of business depended to such an extent on the car that he could not afford to put it aside because of cold weather. Some of the owners said that during the very cold weather they gave up the recreational use of the car, but that giving up the business use could not be considered.



It is not too early to have the Christmas merchandising plans complete. Your competitors are ready.



Tire Ethics

RECENTLY a tire manufacturer made the statement in a meeting of his fellows that he did not believe there was an ethical tire dealer in the country. This statement was quoted in MOTOR AGE and some other automotive magazines and has created a considerable comment. As a rule the dealers do not agree with the manufacturer. One dealer, after thinking the statement over for some time, said:

"It seems to me that the only answer to that statement is to ask 'How many tire makers are entirely ethical?'"

It would appear that this man, an automotive dealer who has quite a large tire department, has asked a question that might be embarrassing to manufacturers generally. MOTOR AGE is not inclined to assume that there is no such manufacturer but we believe that it will be easier to find an ethical tire dealer than an ethical tire manufacturer.

The stories of unfair competition that one hears when he mingles with the tire dealers are remarkable and they are so numerous that after while they lose interest. The only point to be made here is to remind anyone making general charges in the tire business that there is something in folk lore about the man who lives in a glass house. General statement are sometimes effective, but seldom true.

However, as tire merchandising must have its beginning at the factory, it would be interesting to have a list of the tire manufacturers who can say that their sales history is entirely ethical. It would be a good beginning in an effort to clean up the present mess.



Cooperation is meeting the other man half way and selecting the plan that seems best to both, not forcing the other fellow to do as you want him to do.



You Can't Tell 'Em Much

AN old negress stood by the light of a street lamp, laboriously turning a small card this way and that, apparently trying to decipher the writing it contained. A benevolent gentleman, thinking to render assistance, stepped up and said, "Pardon me aunty, may I read your card for you?" The negress raised herself to her full height of five feet three and haughtily replied, "You mine you business, donchu fink I kin read?"

A certain large electrical company was noted for its staff of engineers, and the work they did, the air of superiority showing in their manner and bearing. A remark was once passed to the effect that you could tell this company's engineers wherever you might see them, and a wit replied, "Yes, but you can't tell them much."

The dealer or maintenance executive, who is most likely

to succeed is awake to note the ideas of others as well as his own. Always acting up to his own conception of the best there is in a business way, putting his plans through with promptness and decision, he is also eager to learn of methods that have made good elsewhere. Such is the spirit of humility, that does not condemn an idea merely because it does not come from within, and it is this same spirit, less frequently encountered, which makes it possible to see a fault in business management, although it be a pet idea. For the good of the ship, the sense of human will and pride must ever give away.



A store front may be entirely eclipsed by a costly billboard. Why not make the store front the billboard and make the advertising effective.



New Friends

BEHOLD the worried electric railway operator bestowing affection upon the Motor Bus! "Come into the family circle," he entreats, "and be one of us."

And then, in an impersonal, flattering way, he discourses: "The automotive industry has developed a vehicle suitable for passenger transportation."

Shy, timid, modest man that he is, and lest he be said to be enamored of this new thing, he hastens to add: "The operating cost per passenger is higher with busses than with electric cars,"—no he doesn't stop there, his emotion revives—"but in spite of this handicap the bus is, in some cases, more economical for hauling light traffic."

Back again to his first love: "The public interest requires that the electric railways should be the sole passenger transportation agency in their respective communities."

The sentiments quoted, except that in the first paragraph, are verbatim from the report of the Railless Transportation Committee of the American Electric Railway Assn. in convention in Chicago.

The busses were there—a dozen or more of them, for the traction men to see and admire. Great big, beautiful, shiny bodies, luxurious upholstery, lights, mirrors, heaters, ventilators—all the comforts that one expects to go with swift, smooth, quiet transportation on pneumatic tires over paved highways.

And the best salesmen of the manufacturers on hand to sing the praises of their beautiful charges, lacked not for audience. What the audience heard was a good deal like this: "The people are demanding better transportation. Towns and cities are expanding. Suburbs are growing up. It is a long and expensive task to extend your rails to them. The people will ride. The independent bus operator will haul them. But he won't stop at your terminal and turn them over to you to carry down town. He will take them all the way. Your own existence demands that you use busses to extend and feed your present lines."

Poor listener. What could he say! Although once he may have bemeaned and belittled the motor bus, tears of contrition now rushed to his eyes and with open arms he embraced the fair one which was to save him from utter ruin.

Who knows what may happen in the transportation field when Clanging Trolley Car makes love to Graceful Motor Bus?

New September Production Record

206,000 Cars and Trucks Make Up Last Month's Output

Fifth Consecutive Time This Year That New Figure Has Been Established

NEW YORK, Oct. 9.—For the fifth consecutive time this year, monthly production records have been broken, September coming through with an estimated output of cars and trucks slightly in excess of 206,000. This sets the month apart as the best September in the production history of the industry, with the previous high mark of 185,000 in 1919 surpassed by a substantial margin. Compared with a year ago, production increased 31 per cent.

The showing is all the more remarkable taken in conjunction with the temporary closing of the Ford plants midway of the month. Ford's final figures are not expected to be more than 90,000 or 35 per cent less than August.

As was expected, there was a falling off from the August total, due not so much to a seasonal decline in sales, although that element entered somewhat, as to the halt in Ford production and the fact that September, in addition to being a short month, was marked by a holiday. All of these factors were looked upon to bring the total down from the 272,000 level established in August.

The policy of manufacturers in shifting selling efforts from a section of the country where there appears to be a decline to a center where the demand holds strong is having the effect of keeping up sales in surprising volume. There is no indication now that the larger manufacturers are curtailing their schedules. In some instances they are opening the month on programs exceeding those of September.

The industry, however, is beginning to feel more acutely the results of the recent rail strike and is experiencing greater difficulty in getting through steel shipments from producing centers. Unless this situation improves materially, it will have an adverse effect on automotive production for October and subsequent months of the year. This will prove of far greater detriment to sustained output than would any decline of sales that may come between now and the closing of the year.

Regardless of what may happen in the last quarter, however, 1922 will see a production of more than 2,000,000 cars and trucks. For the first nine months of the year a total of 1,873,000 has been reached.

Truck business continues steady improvement, a larger market developing for the heavy duty vehicles.

Parts business shows no signs of a

let up, car makers continuing to order far ahead. Collections, in keeping with the general good condition in this branch of the industry, remain good.

Distributor's Clinic Aids Dealers in Maintenance

BOSTON, Oct. 6—"The Overland Automobile Clinic" is the name of the new department which opened Oct. 1 in the big Willys Overland building on Brookline avenue, for the benefit of the New England dealers. "You know in medicine the only way you really find out about anatomy or ailments is to have clinics in the hospitals where the specialist and the leading doctors do the operating, or prescribe the treatment, while the juniors and the students stand around, watch and listen, getting the benefit of the knowledge of their superiors," says Manager A. S. Fitch.

"Therefore, I determined to open a clinic. Letters have gone out to dealers and they pick out the time they can attend. A certain number will be chosen every week. We shall take down a car and illustrate to them all the short cuts, the methods of repairs, the faults of units—for even some units have faults—and in addition to our men detailing what they have learned through years of repairs, men from the electrical factories will discuss coils, timers, etc., oil men will tell about fuel, and so on, until the dealer and his service manager will know a great deal more about the cars they are handling than ever before. The time has gone by when you order a carload of cars shipped to a dealer, and then forget him until another order is due him. You must reach out to help him solve all his problems, and keeping his customers' cars in running order at low cost is the only way to meet the present day demand for transportation."

PREMIER TO BE SOLD

INDIANAPOLIS, Oct. 10—Assets of the Premier Motor Corp. will be offered at private sale here Nov. 14, or at public auction at the courthouse (Indianapolis) at any date thereafter, according to a decree issued here yesterday by Judge Linn D. Hay in Superior Court. As a result of a "friendly" receivership suit brought by the American Foundry Co. in July the court appointed the Fletcher Savings and Trust Co., receiver July first. At the time of the suit and the appointment of the receiver there was announced to the creditors a plan of reorganization drawn by a reorganization committee. One purpose of this plan was to have a judicial sale of the property in order to clear the title.

Last Month's Sales About Equal to Those of August

Increase in Some Places and Decreases In Others, According to N. A. C. C. Directors

NEW YORK, Oct. 7—Directors of the National Automobile Chamber of Commerce met preliminary to the general meeting of members.

The directors were told that September sales were about the same as August. In some places increases were reported, while in other decreases took place. On the whole, however, it was a better September than usual.

Enclosed cars averaged about 35 per cent of the sales. In sections like the Carolinas the sales of enclosed cars averaged about 18 per cent, but in sections like Maine, Michigan and South Dakota they ran as high as 75 per cent.

Used Car Question Again

The used car situation again bobbed up, the menace being ever greater than during the summer months. Dealers, it would seem, are overtrading; that is, they are making too big allowances for this season of the year. They seem to be unable to realize that they cannot get spring prices in the fall. Lower prices allowed on used cars taken in at this time of the year seem to be one of the possible solutions of what is regarded as a grave problem.

Reporting on the traffic situation, Chairman W. E. Metzger told of the co-operation that is being given by the car service division of the American Railway Association, which has asked its carriers to "see that the proper instructions are in effect on your railroad to secure proper handling and prompt movement to the fullest practicable extent of automobile cars, particularly to prevent the failure to recognize the primary use for which they are constructed." This may afford some relief, but on the whole general railroad operating conditions continue unfavorable and with heavy continued production driveaways will undoubtedly be necessary.

200,000 VEHICLES FINANCED

NEW YORK, Oct. 9—Since its inception in 1919 the General Motors Acceptance Corp. has financed under its retail plan more than 200,000 motor vehicles, reports President C. C. Cooper. Under the corporation's wholesale plan more than 140,000 have been financed. The retail value, under both plans, totals more than \$400,000,000. During its existence the corporation has negotiated more than \$290,000,000 of its obligations with banking institutions throughout the United States.

85 Makes to be at National Shows

C. B. Wilson Resigns as Vice President of Willys-Overland

John N. Willys Expected to Take Over Duties, Which Include Those of General Manager

TOLEDO, Oct. 9—The resignation of Charles B. Wilson as vice-president and general manager of the Willys-Overland Co., presumably to make way for President John N. Willys to take over those duties, was accepted by board of directors at its meeting late Wednesday.

While discontinuing his active association with the affairs of the company at a time when plans are being laid for a new fiscal year, Wilson will continue a factor in the Willys-Overland affairs, remaining a director in the Willys-Overland Co., president and director of the Willys-Morrow Co. of Elmira, N. Y., director of Willys-Overland, Inc., and president and director of the Wilson Foundry and Machine Co., Pontiac, Mich.

At the meeting at which the resignation was accepted, H. L. Thompson was elected chairman of the board and chairman of the executive committee.

RECEIVER FOR TEMPLAR MOTORS

CLEVELAND, Oct. 8—T. L. Hausmann of Lakewood, Ohio, has been appointed receiver for the Templar Motors Co. on application of the United States Axle Co., of Pottstown, Pa., in which the Templar company joined. The action followed the filing of a bill of complaint by the United States Axle Co., which charged that the Templar company has debts approximately \$1,400,000, which it is unable to pay. The axle company placed its claims at \$12,500. The complaint places the valuation of the Templar properties at \$3,000,000, but states it is unable to continue operations because of lack of working capital.

NEW 6-CYLINDER ROLLS-ROYCE

NEW YORK, Oct. 7—S. de B. Keim, head of Rolls-Royce of America, Inc., states that the 20 h.p. six cylinder Rolls-Royce, the first model of which is being tried out over French roads, will not be made in the American plant at Springfield, Mass., and that it will be several months before orders for this new model can be accepted in this country.

According to cables from the Paris Salon which opened last week, the announcement of the new Rolls-Royce model came as a surprise. For 15 years the English company has been devoting itself to the manufacture of the well known high powered model, but when the Salon opened, the Rolls-Royce stand carried a placard announcing that orders would be accepted for a 20 h.p. six cylinder model. At the same time it was discovered that one of the new

models was being given a test over French roads. It was not exhibited at the Salon, however.

BIRMINGHAM OFFICIALS INDICTED

WASHINGTON, Oct. 7—Twenty-three officials of the Birmingham Motors Co., headquarters in Jamestown, N. Y., with promotion offices here, were named in a formal indictment returned here by the grand jury, charging them with illegal use of the mails. Seventeen of the 23 named were also named in a presentment to the grand jury last summer on a charge of using the mails to defraud. The charge of conspiracy also was contained in the indictment.

The Birmingham Motors Co., it is alleged, has sold several hundred thousand dollars' worth of stock in Washington, capitalizing a "no-axle" automobile. In the prospectus of the concern it was claimed the "no-axle" automobile would revolutionize the automobile industry.

NEW 4-DOOR FORD SEDAN

DETROIT, Oct. 10—Ford Motor Co. is now in limited production on a four-door sedan which will sell at \$725 at the factory. The model is more commodious than the two-door sedan and is designed to meet a particular demand that Ford dealers have been experiencing. The two-door sedan will be continued as the large production vehicle of this type.

ELGIN PRICES REDUCED

ARGO, Ill., Oct. 10—Material reductions in the prices of Elgin models are announced as follows:

Model	New Price	Old Price
Phaeton	\$1125	\$1295
Standard Scout	1125	1345
Special Sport Model	1165	1425
Sedan	1645	1695

ENCLOSED CAR SHOW AT HOLYOKE

HOLYOKE, Mass., Oct. 9—The Holyoke Automotive Dealers' Association has voted to have an enclosed car show Oct. 12, 13 and 14, in the new salesrooms of the Magna Auto Co. As there was no show in the city last year, special efforts are being made to make the coming event a big success.

FRIENDLY TOWARD MOTOR BUS

CHICAGO, Oct. 9—The American Electric Railway Association, in convention here last week, adopted resolutions expressing a friendly attitude toward the motor bus which was described as a valuable feeder and auxiliary to the electric railway.

WASHINGTON OFFICE MOVED

WASHINGTON, Oct. 9—The Washington editorial offices of MOTOR AGE and other publications of the Class Journal Co., have been moved from 816 Fifteenth street, N. W., to 26 Jackson place, N. W.

Car Makers Draw For Space at New York and Chicago

Public to See Best Variety of Products and Best Values, Says Manager Miles

NEW YORK, Oct. 5—Drawing for space at the 23rd annual National Automobile Shows took place at the National Automobile Chamber of Commerce offices here today.

Eighty-five makes of cars were represented. "The variety of models to be offered," said S. A. Miles, show manager, "in open, semi-closed, and enclosed types presents the best product at the best values the public has ever seen."

The National Automobile Shows will be held in Grand Central Palace, New York, Jan. 6-13, and at Chicago (Coliseum and 1st Regiment Armory), Jan. 27-Feb. 3.

The following makes of cars were represented at the drawing:

Ambassador	Lincoln
Anderson	Locomobile
Apperson	McFarlan
Auburn	Marmon
Buick	Maxwell
Cadillac	Mercer
Case	Milburn Electric
Chalmers	Mitchell
Chandler	Moon
Chevrolet	Nash
Cleveland	National
Climber	Noma
Cole	Oakland
Columbia	Oldsmobile
Courier	Overland
Crawford	Packard
Davis	Paige
Detroit Electric	Paterson
Dodge	Peerless
Dorris	Pierce-Arrow
Dort	Pilot
Durant	Premier
Earl	Rauch-Lang
Elcar	Rickenbacker
Elgin	R & V Knight
Essex	Reo
Franklin	Roamer
Gardner	Rotary Six
Gray	Saxon
Handley-Knight	Sayers
Hatfield	Standard
Haynes	Stanley
H. C. S.	Star
Hudson	Stearns-Knight
Hupmobile	Stephens
Jewett	Studebaker
Jordan	Stutz
King	Templar
Kissel	Vellie
Kline Kar	Westcott
Lafayette	Wills-St. Claire
Lexington	Willys-Knight
Liberty	

THE NASH TIMES PUBLISHED

KENOSHA, Wis., Oct. 9—Nash Motors Co. has commenced the publication of a monthly house organ for its dealers, known as the Nash Times.

KELLY-SPRINGFIELD REDUCES

NEW YORK, Oct. 10—Kelly-Springfield Tire Co. announces a new net price list effective today, which shows average reduction of about 20 per cent on fabrics and 10 per cent on cords. In addition, the excise tax is included in the new list, whereas in the old one this tax was extra. The list that was superseded today was put into effect Dec. 1, 1921.

N. A. D. A. Broadcasts Talk on How to Buy an Automobile

Address Prepared by President W. J. Brace to Go Out Simultaneously From 100 Radio Stations

ST. LOUIS, Oct. 7.—A radio broadcast from more than 100 stations throughout the United States on the night of October 12, will be used by the National Automobile Dealers' Association to tell radio fans who are also motorists or prospective motorists "How to Buy an Automobile." As this is a subject that engages the attention of 2,000,000 or so persons in this country every year, it is expected that considerable popular interest will be created in the radio world that night.

This will be the first time in the history of radio that practically every broadcasting station of any importance will carry to its listeners the same message at the same time. The public will be told in this talk just what the automobile industry is doing to make the ownership and operation of a motor car more pleasant and profitable and what the factors are that should be borne most strongly in mind in determining the purchase of a new automobile.

Particular stress is laid in the address upon the importance of buying the right kind of car from the right kind of dealer. Especial attention is called to the intimate relation between dealer and owner in the matter of the proper maintenance of a vehicle and advising the public to consider carefully the time in which the dealer has been in business, his financial strength and his reputation for honesty and fair dealing with his customers and fellow dealers.

The address which will be given by the broadcasting stations was prepared by W. J. Brace of Kansas City, president of the National Automobile Dealers' Association, who is one of the oldest and most successful automobile distributors in the United States. Copies of this address were sent to more than 100 leading dealers in 100 cities after they had obtained permission from the broadcasting station for its use.

It is estimated that several hundred thousand persons, perhaps more than a million will be reached by this method with the message at the same time.

BEST QUARTER FOR NASH

KENOSHA, Wis., Oct. 9.—Last quarter's production of Nash automobiles was the largest of any quarter in the history of the Nash Motors Co., it was announced here by C. B. Voorhis, vice-president and director of sales. Indications are that the production this month will be the largest of any October in the company's history, Voorhis said. The output is running between 192 and 200 sixes and fours daily.

Sales are continuing good, Voorhis said, with the farm districts buying in greater quantity than he had expected.

The demand for enclosed models is increasing rapidly and the company is doubling the capacity of its body plant in Milwaukee where the enclosed bodies are made.

SPRINGFIELD (MASS.) SHOW FEB. 26

SPRINGFIELD, Mass., Oct. 9.—At the annual meeting of the Springfield Automotive Dealers' Association it was voted to have the annual show Feb. 26 to March 3, probably at a building of the Eastern States Exposition. Final decision respecting an enclosed car show was deferred until the question of a suitable show place could be investigated. Tentative plans call for a three-day exhibition the last of this month.

New officers of the association are: President, John S. Harrington; vice-president, J. Walter Norcross; secretary, Harry W. Stacy; treasurer, A. E. Reopell. Committee on the annual show consists of George G. Byrnes, chairman; R. M. Sauters and Charles W. Culver. It was decided to engage quarters for a permanent office of the association, with full-time secretary.

ERSKINE GIVES PARK TO CITY

SOUTH BEND, Ind., Oct. 7.—A. R. Erskine, president of the Studebaker Corp., and Mrs. Erskine have presented to the city 120 acres to be used as a park. The property is valued at \$240,000 and is almost opposite the Erskine home on Miami road. The acreage is sufficient to permit of a golf course, ball park, picnic grounds and a general park for the public. At a special meeting of the city council, called by the mayor and held during a dinner given by that official, at which the gift was announced, it was decided to call this public playground Erskine Park.

GOOD QUARTER FOR OVERLAND

TOLEDO, Oct. 7.—The greatest quarter of this year or last and close to the banner quarter of 1920, when 37,400 cars were produced, is reported by the Willys-Overland Co. for July, August and September, in which period the production exceeded 37,000 vehicles. Total current assets of \$28,791,096 and total current liabilities of \$26,843,347 show in the balance sheet.

TIRE PRODUCTION INCREASES

NEW YORK, Oct. 6.—Figures compiled by the Rubber Association of America, Inc., for the Department of Commerce show that during August there was an increase in production of pneumatic casings, inner tubes and solid tires over July. This follows a decline in casing and tube production in July over June.

KELSEY GEAR-DRIVE CARS

NEWARK, N. J., Oct. 7.—The Kelsey Motor Co. has brought out a line of standard gear driven automobiles in addition to its friction-drive line. Prices of the gear driven cars are the same as those of the friction-driven cars.

Southern Farmers Find Use of Tractors Is Profitable

Favorable Report From 86 Per Cent of Owners Interviewed by Department of Agriculture

WASHINGTON, Oct. 7.—Is the tractor more serviceable, the year around, than horse drawn power on the farm? This question, more or less a mooted one, has been made the subject of a study by the Department of Agriculture, which has announced findings, based on a survey of southern farms. In announcing the results, the department makes it clear, that the survey covers conditions in the South and is not to be construed as applicable to the entire farming industry of the United States.

Eighty-six per cent of the farmer owners interviewed stated that their tractors were proving profitable, in comparison to horse drawn equipment. Ninety-six per cent of them declared that they intended to use them the following season, as did also 52 per cent of those who did not believe they were profitable.

The canvass, which was made in the spring of 1921, included 684 tractor owners in Alabama, Georgia, North and South Carolina, and Tennessee, all of whom had bought their tractors new between March, 1918, and September, 1920.

In order that farmers may take advantage of the survey the department has issued a Farmers' Bulletin No. 1278, entitled Tractors on Southern Farms, showing in detail the department's findings. The experience of present owners is summarized with reference to the advantages and disadvantages in their use; the sizes now used on farms of varying acreage and the sizes they believe would be the most suitable for their condition; estimates of the probable life of their tractors; cost of operation; the kind, quality, and quantity of work, as well as other related information. The booklet is free on request.

GOOD SALES IN ALABAMA

BIRMINGHAM, Ala., Oct. 9.—Prospects for the sale of automobiles in the country districts of Alabama are looking better every day. Farmers are paying debts that they have owed for the last three years, according to F. O. Hotten, supervisor of the bureau of markets of the state department of agriculture, who recently made a trip through the central section of the state.

LOCOMOBILE SCHEDULES ASSETS

BRIDGEPORT, Conn., Oct. 7.—The Locomobile Co. of America has filed a schedule of assets and liabilities in bankruptcy court here. Assets are estimated at \$3,129,200 and liabilities at \$5,908,161. This is the beginning of final steps in the adjudication of the affairs of the company, preliminary to its formal sale to W. C. Durant.

Try-Out Courses to Check Speedometers in St. Louis

Motorists May Easily Determine If Mileage Is Accurately Indicated By Instrument

ST. LOUIS, Oct. 9.—Three routes for checking the accuracy of speedometers, each route being a surveyed mile in length, have been installed in St. Louis through the cooperation of Dan Hyland of the Stewart Warner Products Service Station in St. Louis, the St. Louis Safety Council and Major Clint H. Fisk, head of the department of streets and sewers. These routes are in West St. Louis, North St. Louis and South St. Louis respectively.

The reason for the establishments of the routes is that motorists frequently argue with traffic officers when accused of exceeding the speed limit. With these checking routes available the motorists will not be able to shift the blame to an erring speedometer.

The motorists can check both his speedometer or speed dial indicator and his speedometer or total and trip mileage indicator by traversing one of the measured routes. For instance if the mile is covered at a uniform speed in five minutes the speed dial should show 12 miles per hour, if it is similarly covered in two minutes should show thirty miles per hour. If the odometer is set at zero at the start, it should show one mile at the finish. The routes are marked at each end by posts bearing metal signs stating their purpose and stating that they were erected by the St. Louis representative of the Stewart-Warner Speedometer Corporation.

Contents of Royal Garage of Spain's Motoring King

WASHINGTON, Oct. 6.—The question of automobiles for the royalty of Spain is assuming serious proportions, according to cable dispatch to the Automotive Division of the United States Department of Commerce. The King's preference is for the American automobile, but for patriotic purposes the King has to purchase at least one automobile of every Spanish make.

There are at present ten Cadillacs in the royal palace, seven of which are new models under process of being assembled and which were ordered the first of July. The new ones are replacing seven old Cadillacs. According to information furnished the Automotive Division, the King himself has for his own personal use one armored Cadillac, one enclosed Cadillac, and two open Cadillacs. The Queen has at her disposal one enclosed Cadillac. The Prince de Asturias has one open Cadillac; the Marquis de Viana has one open and enclosed Cadillac; and the Marquis de Torrecilla has one open and one enclosed Cadillac. It

is recorded that there is an Overland "family car." In addition to the above, the keeper of the royal palace has an enclosed car, and the royal household is provided with four delivery cars and two touring cars for run-about purposes. In addition to the American made cars, the royal garage is equipped with five makes of the most popular Spanish cars.

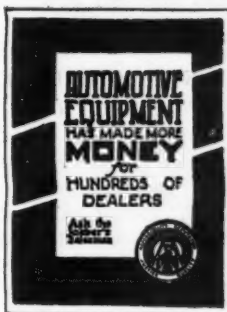
September Is Biggest Month In Oakland Production, Sales

PONTIAC, Mich., Oct. 8.—September was the biggest month of the year in production and sales for the Oakland Motor Car Co., according to W. R. Tracey, assistant sales manager, who says that during the month the plant surpassed the mark of 150 cars daily, set as a maximum.

Prospects for October are that the sales and production will be greater than last month, with the two new enclosed models contributing largely. The Oakland sedan and five passenger coupe put on display in New York last week have brought an unexpectedly large response, Tracey says, and they will be rushed into production which will start about Oct. 15. Both the sport model and the two passenger coupes are over sold at present.

A. E. A. Uses Stickers to Boost Equipment Sales By Dealers

CHICAGO, Oct. 9.—A new sales promotion plan being used by the merchandising department of the Automotive Equipment Association is the distribution of attractive and well-worded stickers to manufacturing and jobber members to be pasted on correspondence with dealers.



The first sticker bears in blue letters on a white field the words: "Automotive Equipment has made more money for hundreds of dealers. Ask the Jobber's salesman." About 400,000 of these stickers have been distributed.

RECEIVER FOR ERIE TRUCK CO.

ERIE, Pa., Oct. 8.—On complaint filed by an Erie bank and other creditors, W. J. Stern has been appointed temporary receiver for the Erie Motor Truck Co. The indebtedness is placed at \$34,000. It is said that an effort will be made to liquidate.

FRANKLIN SHIPMENTS DOUBLE

SYRACUSE, N. Y., Oct. 9.—September shipments from the factory of the Franklin Automobile Co. were double those of August and set up a mark almost 50 per cent higher than that reached during September of last year.

Factory Branches Take Over Sale of Two Cars in Boston

Marmon and Cleveland and Chandler Companies Change Method of Distribution

BOSTON, Oct. 7.—Changes continue to take place at Boston in the way of distributors and dealers. Following the announcement recently that Frank E. Wing had been superseded as Marmon dealer—he had handled the line exclusively for 18 years—by the Marmon Boston Co., comes the news of the taking over of the Cleveland and Chandler lines by the factories here.

The Chandler Motors of New England, had been distributing the Chandler and Cleveland for some years. Business took a turn for the worse some time ago, and so executives from Cleveland came here and took over the business, turning it into a factory branch. In a few days the personnel of the new company will be announced.

J. W. Bowman, pioneer dealer, who handled Stevens Duryea and then took on the Daniels eight, announced a few days ago that he was retiring from the automobile business. His salesrooms on Massachusetts avenue will be taken over by John H. Johnson, the Buick dealer, who has a place next door.

FINANCE COMPANIES TO MERGE

NEW YORK, Oct. 6.—Stockholders of the Continental Guaranty Corp. of New York have been asked to vote favorably on the offer of the Commercial Credit Co., of Baltimore, which seeks to purchase the entire capital stock of the New York concern, or failing in this, to take over not less than two-thirds thereof. Both these corporations have been prominent in the handling of automobile credits, the New York company numbering John N. Willys and J. D. Dort among its directors. If the deal goes through the Commercial Credit Co. and its affiliations will have aggregate resources of about \$55,000,000 and the combined annual volume of business will total in the neighborhood of \$135,000,000. The cash capital will be \$9,000,000 and the surplus and undivided profits \$2,100,000.

The Continental Guaranty has financed sales of motor vehicles to the aggregate value of \$265,000,000. Organized in 1916, of late it has branched into other fields than automobile finance.

NEW TRACTOR PLANT

MILWAUKEE, Wis., Oct. 9.—In order to give the tractor division the full benefit of all facilities provided by extensive construction work based on the present and future needs of this department, the Allis-Chalmers Mfg. Co. of Milwaukee has started the work of erecting a one-story brick and steel shop building, 175x400 ft., at the main work in West Allis. A site of ten acres has been acquired adjoining the present large works for the present extension.

Cleveland Automobile Row Gets Big Shake-Up in Selling

Hudson, Essex, Chandler and Olds' Lines Changed Hands On Oct. 1

CLEVELAND, Oct. 7—Automobile row here received its biggest shake-up of the year when on Oct. 1 distribution of the Hudson, Essex, Chandler and Olds was placed in new hands.

The Stuyvesant Motor Co., which in 1920 built a \$1,500,000 sales and service plant to handle the Hudson and Essex cars, has relinquished those two cars and has taken over the Chandler six from the Simmons Motor Co.

The R. J. Schmunk Co. has taken over the distribution of the Hudson and Essex models. Schmunk was for many years sales manager for the Peerless Motor Car Co. He left that company when R. H. Collins of Detroit acquired control of the majority of the stock.

The Simmons Motor Co. has taken over the distribution of the Oldsmobile from the Ohio Oldsmobile Co. All three corporations have large sales and service stations in Euclid avenue. The Stuyvesant company is keeping open house all week to display its new line of Chandlers. On Oct. 6 dealers from a large part of Ohio and West Virginia were guests of the new distributor and Chandler executives in this city.

Chicago Joins War On "Short Measure" Stations

CHICAGO, Oct. 9—Following a number of complaints which were made by members, the Chicago Automobile Club's investigator, R. N. Allen and an attache of the city sealer's office began a series of investigation which has led to the arrest of 14 filling station owners here, charging dishonesty in selling gasoline.

A five-gallon dummy tank was used by the investigators and shortages of from 7 to 168 ounces were reported. Suits have been filed against the dishonest station owners and the work of locating other guilty ones continues under the joint direction of the club and the city.

Following the first arrests, Allen said that car owners had been robbed of thousands of dollars and that the work would continue until the situation is cleaned up.

MANY MERCHANDISING MEETINGS

CHICAGO, Oct. 7 — Merchandising meetings are being held almost nightly by the Automotive Equipment Association. At a meeting of dealers at Springfield, Mo. last night the "Shop Profits" picture was shown and a talk was made by B. W. Ruark. Ruark and E. C. O'Donnell addressed a meeting of jobbers at LaSalle, Ill., the evening of Sept. 26. Meetings are scheduled for Decatur and Pontiac, Ill., Oct. 9, and Evansville, Ind., Oct. 13. Meetings also are being con-

ducted by manufacturers and jobbers who are members of the A. E. A.

Meanwhile, Ray W. Sherman, merchandising director of the A. E. A., is on the Pacific with a schedule that will keep him busy for several weeks. After an extensive tour of California he will go into Oregon and Washington. His Oregon dates are as follows: Medford, Oct. 13; Roseburg, Oct. 14; Eugene, Oct. 16; Salem, Oct. 17; Portland, Oct. 18.

Motorists Asked to Sign Pledge of Carefulness

WASHINGTON, Oct. 7—Officials of the American Automobile Association are asking their members throughout the country to sign the "Pledge of Carefulness" issued by the Highway Education Board of Washington in connection with its safety program for 1922 and the national safety essay contest for elementary school pupils. The pledge follows:

"Realizing my responsibility as an American Citizen to secure the safety of others by careful conduct on the streets and highways, and,

"Realizing that the accident and the death toll of my nation, state and city can best be reduced by thoughtfulness and carefulness.

"I pledge myself to be considerate of the rights of others while on the streets and highways; to learn and observe traffic rules and regulations to the best of my ability; to cooperate in a campaign of carefulness, either as a pedestrian or as a driver of a vehicle, and I will, by precept and example, endeavor to assist others in making streets and highways safe."

FORD GETTING BACK TO SCHEDULE

DETROIT, Oct. 9—Ford Motor Co. is working back to a production point which will carry it along at the record capacity mark reached just previous to the closing on Sept. 16. Retail sales of both cars and tractors are reported to be as brisk as at any time during the year, and running slightly in excess of production capacity.

With the exception of one or two bad spots, the demand is general from all parts of the country. Farmer buying is reported to be good, the company not experiencing any falling off because of low farm prices. The bad spots, the company declares, are spots that have been bad all year, but are limited in area and have no important effect on general business in any locality.

SALES IMPROVE IN IOWA

DES MOINES, Ia., Oct. 7—Considerable improvement in the sale of motor vehicles and equipment in Iowa as compared with a year ago is apparent. The farmers, however, are coming back rather slowly and live stock is the principal source of surplus money. Prices of other products have been too low. Light trucks are selling fairly well.

Kettering Describes the Automobile of 5 Years Hence

Vice-President of General Motors Addresses Dayton Section of S. A. E.

DAYTON, O., Oct. 11—With the public demanding pre-war prices and with labor and materials still far above that scale, the economic problem of the present situation rests upon the engineer, C. F. Kettering, vice-president of the General Motors Corp., said at a meeting of the Dayton sections of the Society of Automotive Engineers.

Better training along economic lines must be given in engineering schools, Kettering said, in order to meet the exigencies of the situation. He analyzed labor and material costs together with overhead to prove that the slice must come in a reduction of overhead. He declared that only through the engineers' understanding of the economic side of production can progress be made.

Kettering discussed the automobile of five years hence, which he declared would be no more than one ton in weight, with better spring suspension, better adapted to changing traffic conditions.

Comparing an automobile of 14 years ago and the present model, he showed that they had the same fundamental parts and that the only improvement was through refinement of parts. This refinement will be carried much farther in the next five years, he predicted. The question of lubrication, he said, is one of the most important of the unsolved mysteries of the engineering profession and one about which the least is known.

Kettering predicted the passing of the village in a very few years and the rapid growth of the small city, with the great growth of improved highways.

"The drug store and the blacksmith are no longer seen in the village and soon there will be nothing left of them but one small store. Trade naturally is drifting to the larger cities, with increased use of the automobile," he said. "It will mean later that the farmer will live in the city or upon the improved highway and motor to his farm to care for his stock and do his daily work.

"The car of the future," he added, "will bear tools plainly marked for their intended use. It will have an improved top that may or may not be lowered. It can be given a finish as good as new in an hour. It will have springs that will make it ride as well as the two ton car of today and it will handle even poorer fuel than is being sold now. This is all coming in the next five years."

WHOA! NOW STEP ON IT

WASHINGTON, Oct. 7—By purchasing an automobile for his official use, Secretary of Agriculture Wallace has broken a long-standing precedent. Since the establishment of the Department of Agriculture in 1889 a horse-drawn vehicle had been the official carriage of the secretary.

Factories Prepare for Greater Output

Reo, Chevrolet, Durant and Gray Are Planning Expansion

Output at Most Plants Well Maintained for This Season as New Models Are Well Received

DETROIT, Oct. 9—Although production in many factories has fallen off perceptibly with the advancement of the season, the larger factories, the "ten per centers" of the industry, are holding close to the schedules set earlier in the year. Cars in the high priced field have been less affected by the change in seasons, and unsettled business conditions, and are maintaining schedules of close to 100 per cent capacity.

Ford Motor Co., since its resumption on Sept. 22, has made a quick return to its former operating schedule and is once again approximating the 5,000 daily mark. There is no indication of a slump in sales, according to Ford officials, and preparations are to continue at factory capacity. Production in September approximated 100,000 despite the interruption, with general increases in business in the United States and abroad.

Dodge Bros. is holding close to its schedule of 600 daily and continues to run behind on its new enclosed models. Buick is operating at new high marks with the addition of the former Scripps-Booth plant, and established a mark exceeding 700 daily in the latter part of the month. Production will continue at approximately this mark in October. Studebaker is continuing to operate at capacity approximating 450 cars daily.

Cadillac is building approximately 100 cars daily. Orders signed by distributors at the recent convention are reported to warrant this output to the first of the year. Packard is approximating 2,000 cars monthly in all models, and has placed commitments on this basis to the first of the year.

Lincoln orders are several months in advance of deliveries and work is under way for a plant addition which will permit of a large extension in manufacturing facilities. Wills Ste. Claire will build more cars in October than in any previous month and reports a volume of business approximating 30 cars daily.

Hudson-Essex production is running at the rate of about 250 cars daily, a large percentage of which is in its enclosed models. Paige-Jewett production for September approximated 3,000 and operations will be continued at close to this rate in October. Hupp Motors is maintaining a schedule approximating 125 daily. Reo is building about 150 vehicles daily and is aiming to increase this to 200 because of demand for its speed-wagons and the popularity of its new passenger models.

Oldsmobile is approximating 125 cars daily, and is experiencing increases in sales under the stimulus of its recent price cut. Oakland is running at about the same daily rate. Chevrolet manufacturing in the past month has been limited because of manufacturing reasons but preparations are complete for entering upon a schedule which will be increased to about 2,000 daily by the first of the year.

Columbia Motors is running at the rate of about 60 daily. Liberty is building about 25 daily. Dort is building about 75 daily. Rickenbacker continues on its schedule of 25 daily which represents normal capacity of its plant. Earl is building 60 to 75 cars daily.

Maxwell is building about 300 daily and Chalmers, pending the reorganization of its financing, continues on its existing schedule of about 25 daily. Durant is building about 125 daily in its Lansing plant and is lining up its material sources for early production of the Star. A start on this is expected at any time now, the principal difficulty being an ample supply of bodies.

Gray Motors is now building 80 cars daily and will increase this to approximately 200 daily by the first of the year. The company is meeting with a large demand for its product both in the United States and abroad, but is compelled to restrict its dealer appointments pending an increase in its production. As in a number of other cases, Gray's problem is also one of bodies, but these are expected to come through in ample quantity soon.

Nash Motors is producing about 200 daily at its Kenosha and Milwaukee plants.

The industrial situation in Detroit shows that manufacturers are expecting a gradual paring off in business from now until show time, but new prices and new models are keeping business at a higher point than might otherwise have been expected. The creation of new values in many lines of cars is having the apparent effect of certain manufacturers being preferred. Good business, however, is being done by all manufacturers according to the strength of their sales organizations.

DALLAS HAS MOTOR HOTEL

DALLAS, Tex., Oct. 9—Dallas has another new automobile hotel. The Jefferson Hotel Auto Storage has just been completed and opened. It is a three story and basement building, and said to be absolutely fire-proof. In the new plant there are 30,000 square feet of floor space available for storage. Elevators are not used, the owners choosing the ramp system instead.

In addition to storing cars, the new company has established service, consisting of washing, greasing polishing and cleaning.

Houston Ford Agents Stage Unusual Merchandising Show

Dealers Cooperate in Bringing the Trucks to the Prospect's Door

HOUSTON, Tex., Oct. 9—The Ford agents here have just concluded a truck demonstration and selling campaign which was something different from other campaigns in this section of the country. It brought the orders and sold the trucks. Incidentally it created an interest which had hitherto been unknown.

The various Ford distributors cooperated in the unique demonstration.

In this out-of-the-ordinary campaign for sales the Ford agents carried the demonstrations to the doors of prospective and even theoretically prospective customers.

The distributors assembled a fleet of 25 different style bodies in trucks. The fleet of cars paraded the streets of the business district every day for one week. There was almost any kind of truck or body needed in this section in the fleet of trucks which meandered through the streets at a regular hour every morning.

When the fleet approached a business house where it was thought the firm might be interested in a truck a demonstration was made showing the advantage of the particular kind of truck for that particular business.

The result was that scores of trucks were disposed of and orders for many more taken. It is estimated that 150 trucks have been sold as a result of the concerted demonstrations and parades. It is certain that this feature will be repeated from time to time by the Ford dealers here.

HAUGDAHL WINS IN FRONTENAC

TRENTON, N. J., Oct. 7—Sig Haugdahl, at the wheel of a Frontenac, drove home in front in the feature event, the Trenton Derby for the International Motor Contest Association trophy, in the get-away day program of the Trenton Fair. Willard, in a Munroe, was second.

The final heat of the Jersey sweepstakes was captured by Ray Lampkin, in a Peugeot. In the time trials the best mark was made by Haugdahl, who went over the course of one mile in 1:00 4/5.

SUNDAY CLOSING IN OHIO

CLEVELAND, Oct. 6—Commencing Oct. 8, Sunday closing will be observed by dealers affiliated with the Cleveland Automobile Manufacturers' and Dealers' Association, which is responsible for the policy. Twenty concerns have agreed to observe the rule and others are expected to follow the lead.

Ohio a Great State for Bus Lines—About 400 Registered

Utilities Commission Has a Hard Time Keeping Track of New Ones Starting Up

COLUMBUS, O., Oct. 9—The Ohio Utilities Commission, especially that department which has the regulation of motor bus lines to look after, has been having a difficult time in keeping track of new bus lines started in the Buckeye State. Up to Sept. 25 a total of between 350 and 400 bus lines was listed with the commission and tariffs filed. It is believed that this is scarcely 50 per cent of the bus lines in operation.

But the commission is in correspondence with about 100 bus companies, many of which are coming in day by day. They do not need to receive a charter, but are amenable to a fine of \$1000 a day if they operate without filing their tariffs and going through the other necessary forms. Likewise, a bus line is liable to a fine of \$1000 a day if it does not live up to its tariffs.

A line has been opened between Columbus and Toledo with hourly service and a very fast schedule, covering the distance in 6 hours and 20 minutes. In fact, the entire state is a net work of bus lines, many of which use touring cars instead of the usual busses.

NEW DORT DISTRIBUTORS

FLINT, Mich., Oct. 7—The Dort Motor Car Co. has recently appointed the following new distributors: Christenson-Davis Motor Car Co., 1125 Van Ness Avenue, San Francisco; Charleston Rickenbacker Co., Charleston, W. Va.; Chattanooga Auto Co., 617 Broad Street, Chattanooga, Tenn.; Logan Auto Co., 1515-21 Broadway, Fresno, Cal., for the San Joaquin Valley; Charles A. Day Motor Co., 110-114 North Royal, Mobile, Ala., for southern Alabama.

Other recent additions to the Dort organization include Perkins Sales Co., Utica, N. Y.; C. R. Miller, Jackson, Mich.; Dort Sales & Service Co., Lansing, Mich.; J. Wendell Green, Pontiac, Mich.; Waddles Garage Kalamazoo, Mich.; Charles F. Henning, Mount Vernon, N. Y.; M. L. Shue, Peterstown, W. Va.

SEES IMPROVED TRACTOR SALES

ROCKFORD, Ill., Oct. 6—A decrease in the stock of tractors and other power farming machinery indicates a move toward better business conditions and increased sales for 1923, Charles S. Brantingham, president of the Emerson-Brantingham Co. of this city, told 50 of the branch managers, assistants and salesmen at the annual conference on Sept. 25 and 26. Many outside points, including St. Louis, Columbus and Des Moines, were represented.

"Prospects for business in 1923 show a decided improvement over 1922," he said. "The depression of 1921-2 is the worst that the company has experienced

in 27 years. Until now there has been a steady increase, but the farmers' strike of a year ago gave us a serious setback from which we are commencing to recover." President Brantingham stated that there could be no expectation of a boom this fall and winter, but he predicted a steady demand for all kinds of tractors and farming machinery, running well ahead of a year ago, and that this will surely increase through 1923. By 1924, he believed, there would be a boom in business in all lines.

Bennett Hill In Miller Special Takes Fresno Race

FRESNO SPEEDWAY, Cal., Oct. 7—Bennett Hill, driving a Miller Motored Special, took first place from Tommy Milton in the 150 mile race here last Saturday afternoon, by a margin of less than 15 yards. Time for the winner was 1 hr. 27 min. 46 1/5 sec., an average of 102 m.p.h., the fastest time ever made on this wooden bowl.

Other drivers finished as follows: Kurtz third; Wonderlich fourth; Elliott fifth; Hearne sixth; Klein seventh; Murphy eighth. Melcher, the only other starter, went out at the 124th lap with engine trouble and did not finish.

About 30,000 saw the race. There were no accidents. Milton hit Klein and turned the latter's car twice around, after Klein had blown a tire in the 149th lap, but no damage was done.

CALIFORNIA HEADLIGHT ADJUSTMENTS

SAN FRANCISCO, Oct. 5—Statistics compiled by the California State Automobile Association show that in one week of September, 3901 headlight adjustments were made by official adjusting stations, members of the association. Of these, northern California stations adjusted 1984 pairs of lights, and southern California stations 1917 pairs. One southern California station has turned in 400 adjustment certificates for one month, a record. One Ford dealer is paying an adjuster \$250 a month, and netting about \$30 a day on this work alone. Some confusion has been caused by the efforts of shops not members of the association to make accredited headlight adjustments, but their adjustments have been found generally inferior to those of the member shops, and their business is falling off.

ATLANTIC COAST ORGANIZATION

WASHINGTON, Oct. 6—Interest in a proposal for an Atlantic Coast Association of Automobile Trade Associations has been shown by dealers in the following cities: Boston, Brooklyn, New York, Newark, Philadelphia, Baltimore, Norfolk, Richmond, Greensboro, N. C., and Atlanta. A number of these dealers have offered to support the movement and, now that the vacation season is over, a meeting of delegates will soon be called to discuss possibilities of organization.

All Lighted Up for Record Breaking Trip



LOS ANGELES, Oct. 6—Starting from here at 11 p. m. Sept. 20 on a transcontinental motorcycle trip, Canonball Baker arrived in New York City at about 10 p. m. Sept. 27. His elapsed time was 6 days 22 hours and 52 minutes, more than 17 hours less than the previous record for the trip by motorcycle.

Much of Baker's fastest driving was done at night and for this purpose he had his machine equipped with a strong headlight and two spotlights furnished by the S. & M. Lamp Co. of Los Angeles.

ORDERS RE VERE MOTORS SOLD

LOGANSPOUT, Ind., Oct. 7—A court order for the sale of the Re Vere Motor Car Corp. of this city has been issued. It calls for the sale of the properties of the company by the Citizens Loan & Trust Co., receiver. Real estate, buildings, machinery and fixtures make up the salable assets of the company and will be placed on the block Oct. 21. All bids received, according to the order, must be accompanied by five per cent of the amount of the bid.

DODGE BROS. NEW PLANT

DETROIT, Oct. 5—The new addition to the Dodge Bros. plant is designed primarily to facilitate the construction and finishing of the company's new all steel bodies, which it is adapting to its enclosed cars. The building will be eight stories high, will provide 440,000 feet of floor space and will cost \$1,500,000. It will be completed about Jan. 1.

FORDSON SHOW AT MEMPHIS

MEMPHIS, Tenn., Oct. 10—The Fordson Agricultural and Industrial exposition held at the Tri-State Fair in Memphis this week was one of the largest and most interesting shows that has ever been staged in this part of the country.

Small-Claims Court Enables Collection of Repair Bills in California Without Cost

Maintenance Man May Invoke the Aid of the Law Without the Usual Expenses Which Might Amount to More Than the Sum Due Him

SAN FRANCISCO, Cal., Oct. 6—Use of the small-claims courts established in San Francisco and Los Angeles is being found of great help in the collection of small accounts by automobile dealers, and especially by service and repair stations and garage men throughout both cities. Heretofore many small accounts were written off as losses by these firms every year, because the cost of collection, in many cases, was greater than the accounts themselves. With the small claims courts now functioning, results to the automotive industry have been so good that the Los Angeles Automobile Trade Assn. has issued a bulletin on the subject, compiled by Richard Ingvolstad, secretary manager. Small claims courts are being located in all counties of the state, so that their services soon will be available to every dealer and service or repair man in California. In his bulletin, Ingvolstad says:

"Every member of this association should take advantage of the unique court created by the last session of the legislature. This court is known as the Small Claims Court, because it handles only suits involving \$50 or less. There is no expense attached, no fees, no costs, no lawyers to pay. There is no red tape, and the procedure is amazingly simple. The controversy is discussed between the

judge and the parties to the suit in an informal manner, the judge renders his decision at once, and such decision is as good as one rendered in the justice court. Free justice is thus obtained quickly. Justices of the peace in this state act as judges of the Small Claims Courts, in addition to their other official duties, and suit must be brought in the township in which the defendant resides. The judge fixes the date of the hearing, and on that date both plaintiff and defendant bring their books, papers, records and such witnesses as they may desire into the court.

"No suit can be brought in this court by the assignee of a claim. This automatically bars collectors and collection agencies. No attorney or any person other than the plaintiff and defendant and their witnesses may appear and file or prosecute a claim. The judge has a right to make any investigation he may see fit, either in or out of court, and has authority to render judgment, fixing time and manner of payment. The plaintiff has no appeal from the judgment of the Small Claims Court, but the defendant may appeal to the Superior Court of the county in which the suit was brought. There is no expense to presentation of a case in the Small Claims Court, even postage and registry fees being paid out of the county treasury."

ment stores, and to be known by the names of the cars they represent. In other words, it is to be a style and beauty as well as automobile show. One of the 24 will be crowned queen of the show and on closing night will receive a Ford coupe.

MILK PRODUCERS MEET

WASHINGTON, Oct. 6—The National Milk Producers' Federation will hold its sixth annual meeting in Springfield, Mass., Nov. 9 and 10, when the Federation is expected to take some definite action on its problem of milk transportation among its 200,000 producers and consumers.

"We shall definitely take up the question of transportation of our product by the inauguration of fleets of trucks," declared Chas. W. Holman, executive secretary of the Federation.

NEW MITCHELL PAINT SHOP

RACINE, Wis., Oct. 7—The Mitchell Motors Co., Inc., has completed a new paint and trim shop which will be operated as a part of its 45-acre plant and accommodate every phase of the final finishing of Mitchell coach work.

Coupon System of Buying Parts Found Profitable in West

Books Valued at from \$45 to \$50 Containing Tickets of Various Prices Are Sold

SAN FRANCISCO, Cal., Oct. 9—Members of the San Francisco Automobile Trade Assn. are finding very useful and convenient the coupon system of buying parts. This method has been given a thorough try-out, having been installed by Arthur D'Ettel, secretary-manager of the local association, nearly three years ago. The coupon book of the San Francisco Repairers' Assn., a branch of the San Francisco Automobile Trade Assn., is now in use by nearly every member. This method of purchasing replacement parts from distributors, is, of course, confined to rather well-organized associations in distributing centers, but it is working well in San Francisco, Oakland, Los Angeles, San Diego and Fresno.

In the smaller communities, car dealers work on such a small margin that it is virtually impossible for them to give discounts on parts, whereas, in San Francisco and the other centers, the repair man deals directly with the car distributor or the parts-jobber.

The plan in use in San Francisco is briefly this: Members of the association are sold coupon books for \$45 and \$90, containing coupons of various nominations, so that change may be made easily. These books have a purchasing power of \$50 and \$100, respectively, which allows the repair man a discount of 10 per cent on parts. The books are printed on special paper, difficult to counterfeit. A repair-shop merely gives its messenger one of these books and lets him pick up the needed parts from as many jobbers as necessary, thus eliminating the handling of cash or blank checks, and doing away with any disputes as to discounts, for the repair man is always sure of his 10 per cent discount, and the dealer of his money, since he cashes in his coupons whenever he desires. The books are sold only for cash, and the money immediately deposited in a banking account.

FIGHTING GLARING LIGHTS

SAN FRANCISCO, Oct. 5—The campaign inaugurated by the California State Motor Vehicle Department to abolish glaring lights resulted in the arrest of more than 200 motorists on the main highway at and near Redwood City, on the night of Sunday, Sept. 17, and almost as many on succeeding Sunday nights in September. The most usual fault was excessive brightness and light directed too high into the air. Many cars were found on which the deflecting lenses had been installed upside down, so that the glare was thrown directly into the eyes of approaching drivers.

St. Paul and Minneapolis to Have Enclosed Car Shows

MINNEAPOLIS, Minn., Oct. 7—Following the recent successful Twin City automobile, accessory and tractor show at the Minnesota State Fair grounds early in September, both St. Paul and Minneapolis are to follow up public interest by staging enclosed car shows in each city.

The Minneapolis show dates were set for Oct. 9-14. This will be the week of the National Dairy Show on the State Fair grounds, to attend which dairy show motor caravans are being arranged from all parts of the northwest. President H. E. Pence of the Minneapolis Automobile Trade Association has named as a committee to arrange for this show, H. L. Schaefer of the Twin City Motor Car Co., L. M. Browne of the Studebaker Corp., and E. W. Moseley of the Harvey E. Mack Co. The displays will be made in the show rooms of all the dealers in the city carrying this sort of car.

The St. Paul Automobile Trade Association is planning its enclosed car show for Oct. 11-14. As an additional attraction in each of the 24 booths in the Auditorium there is to be a St. Paul girl clad in fine clothes furnished by some of the St. Paul women's furnishing and depart-

Owner Must Pay License for Year Car Was in Dead Storage

Interpretation of Minnesota Law Likely to Hinder Sale of Unoperated Used Cars

MINNEAPOLIS, Minn., Oct. 7—Under a decision of the Hennepin County District Court an automobile in this state which has been in dead storage a year or longer may not be subsequently licensed in Minnesota for the current year unless the license fees for the time in storage, plus a penalty, are paid. It is foreseen that enforcement of this regulation will interfere with the sale of used cars which may have been out of use for a period and therefore not licensed for the preceding year.

The case was a mandamus suit brought by G. A. Will, attorney for the local and state automobile associations, in behalf of an owner who sought to compel the secretary of state to issue a 1922 license tag for his car upon payment of the annual fee of \$30. The car had been in dead storage throughout the year 1921, but previously had been licensed in this state. The secretary of state demanded payment of \$30 fee and a penalty of \$7.50 for 1921, which the owner refused to pay. The secretary of state was acting under an amendment to the law which has been in effect for more than a year, but the constitutionality of which was attacked by the attorney for the owner.

The law provides that the license fee paid by the owner of an automobile shall be in lieu of all other taxes on the car, and on this ground the court held that the use or non-use of the car was not material to the question of payment of tax. Some 200 other owners who had refused to pay last year's tax on stored cars were awaiting the outcome of the case.

PHILADELPHIA IMPROVES TRAFFIC

PHILADELPHIA, Oct. 10—The new synchronized system of traffic control, which soon will cover all the congested streets in the center of the city, went into effect this week in North Broad street between Spring Garden street and Columbia avenue. Straight white lines and arrows marked on the asphalt help to direct traffic. A green light means "go," a white light "get ready" and a red light "stop." The automobile controls are operated by traffic policemen standing at light standards. Pressure on a button there changes the light colors for 12 blocks. Each standard has three long arms, each with a light disc. At all the important intersections traffic policemen with hand-semaphores are on duty following the lights in manipulating their signals. Each signal control station is fitted with a master key which permanently fixes a red light against all

traffic at every tower. This system is planned to halt motor car thieves as soon as an alarm has been given. The new system is considered a success by the city authorities.

Wants to Protect Railways Against Motor Competition

CHICAGO, Oct. 6—A plan for state regulation of automobile freight and passenger transportation in order to prevent encroachment upon the business of the railroads was made by John N. Glenn, manager of the Illinois Manufacturers Association, in an address recently at Aurora, Ill. He said:

"So much business has been diverted from the railroads to automobiles, coupled with the inability of the public highways to meet the demands, that it is imperative that this control be assumed. Railroads, even with gasoline propelled engines, can not meet truck competition because they pay enormous prices for original purchase and maintenance of right of ways while the commonwealths maintain the truck highways.

DALLAS SPACE TAKEN

DALLAS, Tex., Oct. 6—The space in the automobile show building at the State Fair, Oct. 6 to 15, has all been taken and the demand for additional space for exhibitions has been so great that something like 100,000 square feet of extra space has been provided by the fair directors to be used in connection with displaying cars and accessories. It is said this space will be utilized by out-of-town dealers who are to exhibit their cars and accessories during the state fair. It is now assured that the automobile show this fall will be the biggest thing of its kind ever staged in the Southwest. It is the first time out-of-town dealers have been given a place to make displays and fifty of these dealers will show their wares.

SANTA CLARA TRADE TO ORGANIZE

SANTA CLARA, Cal., Oct. 12—At a recent meeting of a number of automobile dealers here, it was decided to reorganize the local trade association. It is believed that the former membership of 200 covered too much territory, as a result of which members took very little interest in the association. The new association is expected to start with about 75 members and it is believed that the maximum will be about 125.

Robert W. Martland, secretary of the California Automobile Trade Assn., was present and outlined a tentative plan of organization.

ELECTED CLUB MANAGER

DALLAS, Tex., Oct. 8—H. N. Legg, has been elected manager of the Dallas Automobile Club, it is announced by President George R. Angell. Legg succeeds Ewing Moseley who recently resigned to accept the position as secretary of the Dallas Fire Underwriters' Association.

2600 Army Motor Vehicles Sold to Dealers in Europe

Trucks and Cars Promised Agricultural Department for Road Work Will Not be Re-imported

WASHINGTON, Oct. 5—As a result of a decision just rendered by the War Department, the 2600 automobiles and trucks, used by the forces in Germany, will not be reimported to the United States, it was announced today.

This decision will definitely settle the differences between the War Department and the Department of Agriculture over the possession of the 2600 trucks, formerly promised the Agricultural Department for use by the State Highway Commissions in connection with the Bureau of Public Roads highway building program.

The trucks and automobiles—all of them high priced cars—had originally been offered to and accepted by the Department of Agriculture. However, before the notification of the transfer to the Agricultural Department had been received by General Allen, in charge of the troops on the Rhine, he had consummated a deal with foreign dealers for the purchase of the entire army of occupation automotive equipment, with the exception of 150 trucks and 23 Cadillac touring cars.

The sale had been so consummated that the War Department declared that it would be placed in an embarrassing position to rescind General Allen's sale, and as a result it was definitely decided today that the equipment would not be brought back to America.

It was announced, however, that the 150 trucks and 23 Cadillacs, unsold, would be turned over to the Department of Agriculture. Also the department will receive 1,000,000 pounds of motor vehicle replacement parts, 2,000,000 pounds of shop and machine tools, 7 tractors, 4 concrete mixers and 4 steam rollers—all of this equipment to be allocated to the State Bureau Highway Associations, through the Bureau of Public Roads.

RETURNS TO TIRE SCHEDULE

AKRON, O., Oct. 6—The Goodyear Tire & Rubber Co., has restored to its former operating basis of five and a half days a week, its plant No. 2 which is confined to manufacture of Ford size tire. The restoration of the full time schedule came Sept. 30, and followed re-opening of Ford's motor car factories.

BUILDING 18-CYLINDER ENGINES

SPRINGFIELD, O., Oct. 12—An order was received during the past few days by The Steel Products Engineering Co. from the chief of the air service at Washington, D. C., for 14 crank cases for 18-cylinder engines.

IN THE RETAIL FIELD

The De Bear Motor Car Co. has been organized in Philadelphia by Harry J. De Bear, president; Fred J. Finkenauer, treasurer and secretary, and his brother, Elmer R. Finkenauer, vice-president. The company will distribute Maxwell and Chalmers cars in the city and vicinity, including a part of southern New Jersey.

Smith Brothers Motor Sales Co., Inc., 1084 Westminster, Providence, Rhode Island, have recently been appointed as Rhode Island distributors for the Anderson "Coachbilt" cars, the Anderson Motor Company, Rock Hill, S. C., manufacturer.

The Empire State Sales Co., headed by W. C. Link, former southeastern district manager for Durant motors, has established sales rooms and service station at 312 West Peachtree street, Atlanta, for the distribution of the Durant and Star automobiles in Georgia and part of Tennessee.

The Orlando Cadillac Co. has been formed at Orlando, Fla., with \$25,000 capital, and will distribute Cadillac cars in that section of Florida. Officers are: W. D. Rogers, president; F. N. Bass, vice-president; B. B. Rogers, secretary; W. D. Rogers is also treasurer.

The B. & O. Motor Co. has been organized and incorporated at Sanford, Fla., with \$50,000 capital, to operate as retail dealers in automobiles, tractors and farm implements. Officers are: P. Jernigen, president and general manager; W. M. Cathrae, vice-president; B. Baggott, secretary and treasurer.

The J. D. Bridges Co. has been formed at Florence, S. C., with \$15,000 capital to establish a business as dealers and distributors of automobile accessories. Officers are: J. D. Bridges, president; G. N. Lathan, secretary and treasurer.

The Consolidated Motor Co. has been organized with \$25,000 capital at Marianna, Fla., to operate an automobile sales and service station. Officers are: C. W. Messer, president; R. H. Adams, vice-president; L. Williams, secretary and treasurer.

P. D. Beville, automobile distributor of Mobile, Ala., has awarded contract for construction of four story building to cost \$100,000, and to be used as an automobile show room and sales building.

The Earl Sales Co., of Birmingham, Ala., formally opened its doors on Monday, Sept. 25, and a showing was made of the newest models of Earl cars. Tunstall Bryars is the president of this sales company and furnished an entertainment in connection with the opening, including music in both the afternoon and evening. This was the first showing of the Earl in Birmingham.

P. D. Beville Supply Co., of Mobile, Ala., local dealers handling the Cadillac, Maxwell, Chalmers and International trucks, is building a large three-story home.

Morrow Motors Corp. has been appointed distributor of National in the New York territory. Morrow also distributes Earl and Templar. National, for a number of years, has been distributed in New York by the Poertner Motor Car Co., which now has the Durant.

The Anderson Motor Company, Rock Hill, S. C., announce that they have appointed Rhoda-Rems Motors, Allentown, Pa., as distributor of the Anderson cars for that territory. Mr. Rhoda and Mr. Rems visited the factory during September and drove back to Allentown in one of the Anderson jobs. The trip was made in good time and without event.

The W. W. Griffin Motor Car Co., Portland, Maine, have been appointed as distributor of the Anderson Motor Company, Rock Hill, S. C., manufacturers of the Anderson "Coachbilt" cars. The Griffin company will cover the entire state of Maine.

Harold D. Knudsen has been appointed Chevrolet dealer for Oakland, Cal., and, under the firm name of Harold D. Knudsen & Co., has opened modern show and sales rooms and repair plant at 1418 Webster street.

Don Shortz, who has been manager of the F. H. Dailey Motor Car Co., Maxwell and Chalmers distributors in Oakland, has started in business for himself, having taken the Maxwell agency for San Pedro and Wilmington, in southern California.

The Auto Necessity Co., formerly the Luthy Battery Co., has been named Vesta battery representative in Oakland by the J. P. Schiller Co. of San Francisco, northern California distributors.

Two former executives of the B. F. Goodrich Rubber Company, T. A. Worden and Carl Fitch, have opened a retail tire depot at 211 Four-

W. W. Griffin Motor Company, 20 West street, Portland, Maine, has been appointed as the state of Maine distributors for the Anderson cars.

teenth street, Oakland. Fitch was for fifteen years director of Goodrich service at Akron, and Worden was branch manager of the Goodrich company in Sacramento.

The Kanouse Automobile Co. of Indianapolis, has been made state distributor for the H. C. S., and the Charles E. Stutz Sales Company, which handled the H. C. S. for many years, is now the state distributor for the Jordan.

Announcement is made that the Anderson Motor Co., Rock Hill, S. C., has appointed Smith Brothers Motor Sales Co., Inc., 1084 Westminster avenue, Providence, R. I., as their distributors for the Anderson cars in the state of Rhode Island.

Rhoda-Rems Motor Cars, Allentown, Pa., have signed with the Anderson Motor Company, Rock Hill, S. C., for the distributor franchise of the Anderson "Coachbilt" line of cars in that territory.

Wallis Baird, Galesburg, Ill., has been named distributor in Knox and Warren counties for the new Star car, manufactured by Durant.

Austin & Hagar will handle the Hupmobile car in New Rochelle, Felham, Mamaroneck and Rye, and will open commodious sales rooms and service station at 345 North avenue, New Rochelle, N. Y.

H. J. Strack, of Des Moines, Ia., has secured the franchise for the distribution of Columbia cars in central Iowa. The new firm will be known as the Strack Motor Sales Company and will be located at 1429 Locust street.

Winton Co. announces the disposition of its Philadelphia branch at 1404 N. Broad street to the Rickenbacker-Philadelphia Company, which will take over the sales representation of Winton cars in the Philadelphia territory. The new company will move to the Winton sales rooms from its present quarters at 1520 N. Broad street.

The Chesley C. Noland, of Guilford, Mo., has just signed a contract to handle the Dort line.

E. A. Myers Co., 235 North Broad street, Philadelphia, has been appointed distributor in Philadelphia and eastern Pennsylvania for Earl motor cars.

J. G. Roberts, president of the Philadelphia Nash Motor Co., distributor of Nash cars and trucks, in Philadelphia, with his associates, has purchased the minority interests of the company from W. V. Faunce, and with Mr. Roberts in control, the Philadelphia Nash Co. now is owned by H. F. Stevens, vice-president; Clark D. Moody, secretary and treasurer, and himself. The company is breaking ground for a new sales and office building at broad and Thompson streets.

Aragona Auto Exchange of West New York, N. J., and Thomas B. Golden of Pottsville, Pa., have been appointed distributors for Traffic truck in their respective territories.

Papers have been filed, chartering the Eaton Buick Co., at Eaton, O., to deal in automobiles and parts, by E. J. White, William M. Watts, Van White, Cora S. White and McClelland White.

The Gardner Motor Co., has appointed the Gale Sales Co., of 891 North High street, Columbus, as central Ohio representative for the Gardner line of cars.

H. K. Smith Co., Ford and Lincoln dealer, Springfield, Mass., has doubled its showroom space by annexing the quarters formerly occupied by the Dunbar-Hoag Co., Oakland dealers, whose large service station has also been acquired by the former.

Edward Berger, formerly of the Hampden Garage, Holyoke, Mass., has organized the Holyoke Velie Co. at the old Cabot Garage in that city, where a sales and service establishment for the Velie will be maintained.

G. William Jocelyn, Holyoke, Mass., has been appointed Massachusetts state distributor for the P. & R. Auto Specialty Co.'s Two-Star products, and will deal in several other lines of motor accessories along with his business as motorcycle dealer.

Harry Holden has succeeded Roland P. Prickett as accessories dealer in Holyoke, Mass. Prickett has opened an accessories store in Springfield.

J. H. Falk has been appointed district supervisor of the Maxwell Motor Corp. in Cleveland, succeeding J. L. Justice, who was transferred recently to San Francisco.

Frederick G. Benn, former branch manager for the Willys-Overland Co., in Springfield, Mass., has been appointed manager of the wholesale division of John S. Harrington, Inc., Hudson and Essex dealer, Springfield, Mass.

Eugene E. Shepard has been appointed sales manager for the Western Massachusetts Cadillac Co., Springfield, Mass.

Automobile Business Outlook In South and West Surveyed

Moon Advertising Manager, Back from Month's Trip, is Enthusiastic Over Prospects

ST. LOUIS, Oct. 6—"I have just returned from a four weeks' trip through sections of the West and Southwest, and I never felt quite so enthusiastic as I do right now," said N. E. McDarby, advertising manager of the Moon Motor Car Co., discussing the business outlook.

In Kansas City he found conditions fairly good in the automotive industry—"exceptionally good for some lines," he said. He found crop conditions splendid throughout Kansas and predicts that dealers in small towns should enjoy wonderful business this fall.

Conditions were somewhat different in Omaha. Only one or two lines were enjoying good business. That was before the settlement of the coal and railway strikes and he has been informed since that considerable improvement has become apparent.

In Lincoln, Neb., conditions were exceptionally good. "Eastern Nebraska," he said, "from all appearances is in for wonderful business this fall. Crops are fine. The farmers are going to make some money and they are going to buy automobiles. They certainly need them—they haven't gotten a new automobile for practically two or three years, and if they don't secure new transportation equipment soon they will have to go back to walkin'."

Conditions in Western Nebraska, around Hastings, were not so good. Crops are not good and have not been for two or three years, and there is not going to be much surplus money. Business was going along nicely in Denver for dealers handling a good product and properly financed.

The outlook in Texas was excellent. The majority of dealers were said to be clamoring for cars, many being far behind with deliveries. Enclosed cars were not as much in demand as in northern states. Business was good in New Orleans. Memphis, hard hit by the depression of 1920, started to come back a few weeks ago, but then the price of cotton declined and prospects are not now so bright.

AKRON ENCLOSED CAR SHOW

AKRON, O., Oct. 5—Akron's first enclosed car show will be held the week of Oct. 18 at the Akron Armory, under auspices of the Akron Motor Vehicle Association. It will also be the Rubber City's first fall automobile exhibit, but will not conflict with the city's annual automobile show usually given in January. Enclosed cars exclusively will be exhibited, over 20 Akron dealers having taken floor space for exhibit of more than 40 of the newest models of enclosed cars of all makes.

CONCERNING MEN YOU KNOW

Jirah D. Cole, formerly field secretary of the Automotive Equipment Association, has been appointed supervisor of merchandising for the General Automotive Corp., Chicago, manufacturer of Monogram radiator caps.

W. B. Fitzgerald, formerly secretary of the Atlanta Automobile Association, and later general manager of the Ford Car Clearing House Association, has been named to head the sales department of the Atlanta branch of the Ford Motor Co., it has been announced by W. W. Mitchell, manager of the factory branch.

James E. Power, tire and battery distributor, and, incidentally, postmaster of San Francisco, is in the East combining business with pleasure, calling on Uncle Sam in Washington with respect to official business, and stopping at the Racine Rubber Company's offices in New York; the Cooper Battery Corporation, in Cincinnati, and the Racine Tire Factory, Racine, Wis. The Power Rubber Company of this city recently was appointed distributor for the Cooper battery in this territory.

Roy C. McDowell, service manager of the Stephens Motor Company, was a San Francisco visitor, late in September, making his headquarters with the W. J. Benson Company, northern California distributors of the Stephens. He is visiting every Stephens distributor in the country.

Guy C. Core has resigned as advertising manager of the Reynolds Spring Co., Jackson, to become identified with the marketing of bonds and securities.

John L. Brown, who has been associated with the Traffic Motor Truck Corp. for the past two and a half years, in the eastern wholesale territory, has been appointed retail sales manager of the Traffic Truck Sales Company of Philadelphia, the Philadelphia branch of the factory.

T. E. Larsen has been appointed salesman for both Paige and Jewett cars for the Guy A. Willey Motor Co., North Broad street, Philadelphia. He was previously connected with the Maxwell-Chalmers Sales Corporation and was manager of the used car department for Herbert Bros.

President H. S. Berlin, of the Victor Rubber Co., upon his return from a trip to St. Louis, Chicago and Cleveland, stated that prospects for the sale of tires are encouraging. Salesmanager H. A. Grubbs has also completed a survey of the situation in Kansas and Nebraska, where he conferred with the dealers.

Roy C. Ellis, for the past four years assistant sales manager and field representative of the automotive division of the Standard Steel Car Co. of Pittsburgh, has joined the sales staff of the Courier Motors Co. of Sandusky, Ohio, as factory representative. Ellis will devote much of his time to special dealer work.

C. S. Bash has been appointed Pittsburgh district supervisor of Maxwell Motor Corp., and A. N. Abend has been named a factory representative there.

E. L. Armstrong, until recently with the Lincoln agency in Columbus, has been appointed service manager of the Jordan-Columbus Co., central Ohio distributor for the Jordan line of cars. Prior to coming to Columbus he was connected with the Cadillac factory at Detroit for 12 years.

John N. Willys will rent an up-river home at Toledo, Ohio, and expects to build next summer with the idea of permanently establishing his home there. This is in accord with his plan to make this his headquarters and the Willys-Overland Co. his one big business concern.

Samuel Vance, Jr., has been appointed sales manager for both the wholesale and the retail departments of the S. R. Blocksom Co., distributor of Stutz cars, Philadelphia.

W. L. McCutcheon has been appointed retail sales manager for Chandler and Cleveland cars distributed by Herbert Bros., 203 Broad street, Philadelphia.

E. L. Bernard is new service manager of the

Willys-Overland, Inc., Toledo, succeeding T. W. Skelding, who has joined the retail sales force.

Charles Cherry has been appointed manager of the newly organized Franklin agency at Fort Wayne, Ind.

Arthur Golden has been appointed assistant sales manager of the Advance Rubber Co. of Brooklyn.

Max Geisler has been appointed secretary and general manager of the Gillette Rubber Sales Co., which has opened offices in Chicago. Geisler has been identified with the tire industry for a number of years and during that time has handled Firestone, Fisk, Columbia and other tire makes. The sales company acts as wholesale distributor for the products of the Gillette Rubber Co. at Eau Claire, Wis. The ultimate aim of Geisler and his associates is to establish a national organization of dealers taking in the entire country.

W. W. Surrall, who has been the assistant sales manager of the Jordan Motor Car Co. for five years, has left the company. He will have charge of the wholesale department of Peterson Motors, Inc., Philadelphia and Peterson Motors, Inc., Baltimore, distributors of Jordan motor cars. Surrall's headquarters will be in Philadelphia.

Lee H. Smith, formerly in charge of appointing of service stations and the sale of equipment to the regular trade in the Cleveland district for the Briggs & Stratton Co., has been made assistant to H. V. Rohm, sales manager for the Briggs & Stratton Co. From now on Smith will make his headquarters at the Milwaukee office.

H. S. Hinrichs, formerly instructor in charge of the Tractor and Auto School, Northwest School and Station, University of Minnesota, Crookston, Minn., is now connected with the service division of the Holt Manufacturing Co., Peoria, Ill.

Arthur M. Kennedy, who has been sales manager of the Franklin Motor Car Co. of Philadelphia, has resigned and has established an independent business in sales, research and promotion, which is intended to serve manufacturing and sales organizations.

C. E. Wetherald, general superintendent of the motor and axle division of Chevrolet Motor Co., has been made assistant to Charles P. Barth, general manager; William Notman, succeeds to Wetherald's former position, and F. O. Tanner, chief inspector of the motor and axle division, becomes superintendent of the gear plant, Detroit.

J. W. Wilford has resigned as superintendent of General Motors axle, gear, forge and power plants and will take a two months' vacation, following which he will enter the manufacturing business in Lansing.

The Advance Rubber Co. of Brooklyn announces the appointment of Arthur Golden as assistant sales manager.

Herbert C. Follinger, manager of the Chicago office of the Chain Belt Co., died of pneumonia at his home in Chicago on Sept. 27. He had been ill but a few days, and the announcement of his death will come as a shock to his many friends in the industrial work, where he was well known. He was 38 years of age and was born at Fort Wayne, Ind.

S. C. Mitchell, acting general traveler of the Dort Motor Car Company, was married in St. Louis Tuesday, September 26, to Miss Adelaide Simons, daughter of Carl J. Simons, who for 11 years was manager of the Studebaker-St. Louis branch and who is now manager of the Republic Truck Company branch there.

F. A. Petrie, president and general manager of the Mission Motor Car Co., Los Angeles, Cal., spent the week of September 20 at the Dort Motor Car Company in Flint, Mich. He reports a very optimistic feeling on the Pacific Coast regarding motor car business and believes 1923 will be the best year the coast has ever had.

W. E. Heinenann, formerly eastern representative of the Templar Motors Co., is now with the Matthews Engineering Co., Sandusky, Ohio.

Rail Congestion Interferes With Automobile Shipments

Embargoes on Traffic Causes N. A. C. C. Official to Seek Relief in Washington

NEW YORK, Oct. 9—Railroad congestion and embargoes have so increased shipping difficulties that James S. Marvin, head of the traffic department of the National Automobile Chamber of Commerce, has gone to Washington to confer with the Interstate Commerce Commission and the Car Service Commission in an effort to gain some relief for the industry.

It is admitted that the situation is a serious one and that driveaways and motor transport are expedients which manufacturers will have to adopt this winter to get material into their factories and their finished products into the hands of their agents. This will make the matter of snow removal a most important issue and the Chamber will make every effort to keep the roads open this winter.

BIG DEBT FOR HIGHWAYS

NEW YORK, Oct. 7—More than a third of the \$1,071,506,981.28, which is the total of the outstanding bonded indebtedness of all the states, has been incurred for highway projects, according to a nationwide survey of state debts and securities just completed by the Bank of America, New York. The construction of highways and bridges is by far the leading single purpose for which the outstanding debts were incurred, the Bank of America statistics show, the total of \$367,687,100 in highway bonds representing 34.3 per cent of the entire indebtedness of the states.

TAKES IN ALL THE FAIRS

BOSTON, Oct. 7—The New England branch of the Willys-Overland company is taking advantage of all the fairs being held in New England, and it is staging exhibitions of taking down the engine of the Willys Knight car to show its simplicity. An Overland truck with a platform is used, and the exhibit draws up to the center of the fair, a talk is given and the engine is taken apart, then put together, illustrating the sleeve valve action.

DRIVES HALF MILE IN 31 3/5 SECONDS

ALLENTOWN, Pa., Oct. 7—In the final race of the day at the Allentown fair, 50,000 people saw Walter Lezotte, of Philadelphia, receive his death-injuries in a collision with Larry Beales, of Boston, after Lezotte had broken the half-mile record of 34 4/5 seconds, established in 1920 by Ira Vail of Boston. Lezotte covered the distance in 31 3/5 seconds. Three hours after the smashup Lezotte died in Allentown hospital from a punctured lung.

STEWART-WARNER SALES GAIN

CHICAGO, Oct. 9—The Stewart-Warner Speedometer Corp. reports that its sales for the first nine months of this year were 80 per cent greater than for the corresponding period last year, and 33 1/3 per cent greater than for the entire year of 1921. Sales for the third quarter of this year were equal to high record of the preceding quarter.

COLUMBIA CLUB ORGANIZED

COLUMBIA, S. C., Oct. 7—The Columbia Motor Club, a branch club of the American Automobile Association, has been organized in this city with 200 charter members. Charles O'Connor, field secretary of the A. A. A., and one or two other men from that organization have been in Columbia working for the membership.

BUSINESS NOTES

Hawkeye Products Co., Davenport, Iowa, has been incorporated with \$50,000 capital to handle automobile accessories. Thomas F. Gleason is president; John H. Beatty, vice-president; Werner Scherz, secretary, and Earl W. Tunis, treasurer.

Grand Rapids Tire & Rubber Corp. will pay the regular 2 per cent quarterly dividend on September 25.

Ottumwa, Iowa, Auto Top and Upholstering Co. is establishing a factory in the former McCarrall Stove Works building, utilizing equipment being transferred from Flint, Mich., by J. W. Betron and his three sons, William, Frank and Eugene, all of whom have had more than 10 years' experience in the auto top finishing. They will specialize in the "California" top. Eugene Betron was in experiment department of the Buick plant at Flint and designed the sport model top used this year on the Buick 55. With his partner he has designed tops on all Buick cars for 1923.

Albert Anderson, Geneva, Ill., has let the contract for a new garage building, 60x100, to cost \$15,000. It will adjoin the present plant, which has been outgrown. The old building will be devoted to repair purposes, while the new will contain the sales and display rooms and office. It is hoped to have the new building ready for occupancy by Jan. 1.

West Side Motor Sales Co. has been organized at Argo, Ill. A garage will be opened at the corner of Archer avenue and 63d street.

The Lambert Tire & Rubber Co., Akron, O., makers exclusively of cushion tires for automobiles, has doubled production and now has a production ticket calling for 350 cushion tires a day. This is the second time this year Lambert has doubled its production. Officials of the company say the new puncture proof cushion tire is meeting with popular demand and is being used as original equipment by some automobile manufacturers.

Some new construction is going on in Columbus, O., in Automobile Row, which is Fourth street, between State and Naghten streets. One of the largest construction jobs is the addition to the building of the Lawwell-McLeish Co., Ford agents. The addition, which is now under construction, will be 63x94 feet and two stories high. Thomas J. Engle has a 99-year lease on a lot 25x150 feet on Fourth street, upon which the erection of a modern sales agency and service station will be started within a month.

The garage of J. W. Milner, Stonington, Ill., was destroyed by fire on Sept. 24, with loss of \$12,000. Five motor cars, awaiting repairs, and many accessories, were damaged. As the loss is covered by partial insurance, the owner plans to rebuild.

Brossier & Brossier, Inc., has been organized at Miami, Fla., with \$10,000 capital, to establish a plant for the manufacture of automobile tops and bodies, and also to operate as automobile dealers. Officers are: G. D. Brossier, Jr., president; M. M. Brossier, vice-president; G. D. Brossier, Sr., secretary and treasurer.

The Western Automobile Supply Co., of Omaha, Neb., has changed its name to Storz-Western Auto Supply Co., to avoid confusion with other concerns with similar names.

A plant at Sandwich, Ont., for Dodge Brothers Motor Car Co., Limited, is being planned.

Plans for a machine shop addition to the Ford Motor Car Company of Canada have been prepared. It is stated that the addition to the plant contemplated at Ford, Ontario, will involve an expenditure of \$6,500,000.

A charter has been issued in Atlanta, Ga., to the Templar Motor Sales Co., a corporation formed to distribute the Templar in the southeastern territory. Incorporators are: J. H. Joyner, F. Waterman and F. C. Tindall.

The Florida Hanson Motor Co. has been incorporated at Jacksonville, Fla., according to announcement here by George Hanson, president of the Hanson Motor Co., to handle the export end of the Hanson business. The company has established relations with a number of foreign dealers and is annually shipping many Hanson cars for foreign sale.

The Marrow-Parkhurst Motor Co. has been organized at Daytona, Fla., to engage in the business as automobile dealers at Daytona Beach, Fla. Capital stock is \$50,000. A James Parkhurst is president, and John M. Fisher, secretary and treasurer.

The Automatic Electrical Devices Co., Cincinnati, Ohio, manufacturers of the "Homcharger," have recently been compelled to add a third plant to take care of the demand for this device. These three factories, all located in Cincinnati, have a capacity of over 1000 per day.

Announcement has been made that the White Co., manufacturers of trucks and cars, will open a factory branch in Chattanooga, Tenn., in the near future. Howard C. Goss, formerly with this company at Nashville, Tenn., will have charge of the new branch.

The Mac-Dry Battery Co., of Tennessee, has opened a branch office in Memphis with Otto H. Cold as manager.

A large accessory store known as "Dad's" Auto Accessories, Inc., will be opened in Nashville, Tenn., within the next week or two. Lovell E. Smith, formerly assistant manager of Dave's Auto Accessories, Detroit, and later manager of Bill's Auto Accessories of Louisville, Ky., will be in charge of this store. He will have as his assistant Millard E. Wyatt, formerly with Stockell Motor Car Co., of Nashville.

The board of directors of General Motors Corp. has declared a dividend of \$1.50 a share on the preferred stock, a dividend of \$1.50 a share on the 6 per cent debenture stock and a dividend of \$1.75 a share on the 7 per cent debenture stock, payable Nov. 1, 1922, to stockholders of record Oct. 9, 1922.

Creditors of the Standard Parts Co., Cleveland, a \$20,000,000 automobile accessory manufacturing plant, which went into the hands of a receiver on Sept. 1, 1920, will receive shortly a payment of 5 per cent of their claims. Federal Judge D. C. Westenhaver today directed that the payment, which will total \$500,000, be made. The sum will come from earnings of the company which has shared with other similar plants in the prosperity which the automobile industry has enjoyed in the last 12 months.

The White Co., Cleveland, on Sept. 30 will mail to stockholders a dividend at the rate of \$1 a share. Quarterly earnings from Jan. 1 to Aug. 31 have exceeded dividend requirements for the entire year and a continued improvement in business is indicated by the volume of orders on hand and in prospect.

At the regular monthly meeting of directors of the American Rubber & Tire Co., Akron, O., a quarterly dividend at the rate of 8 per cent per annum was authorized, payable Oct. 2.

Whyte-Duffield Manufacturing Co., maker of Whyte Motor-control steering gears, a device whereby indicating instruments like speedometer and switches, are removed from the dash and steering wheel, has taken possession of its new plant at 215 South Leavitt street, Chicago. The company now is in production with several manufacturers' contracts on hand.

Judge Hugh M. Morris of the United States District Court of the District of Delaware, has enjoined the Bowman-Gould Co. and restrained it "permanently from making or selling, directly or indirectly any one-piece piston rings so similar to the peculiar and distinctive type of piston rings manufactured by the No-Leak-O Piston Ring Co. as to be liable to deceive purchasers."

A new Luthy service station has opened at Sixth avenue and Keosauqua, Des Moines, Ia., under the management of J. H. Horsley. The new station will feature Luthy batteries, high grade tires and Marathon gasoline.

A dividend of 2 per cent on preferred stock has been declared by The Black & Decker Mfg. Co. for the third quarter of 1922.

Electric Motor Truck Association, New York, is offering a prize of \$1,000 for advertising slogans which will describe electric truck service in city hauling. No slogan may be more than ten words and the applicability of each slogan to the electric must be shown.

In a news item in MOTOR AGE Sept. 21 concerning the opening of new offices in the General Motors building, Detroit, by the Corcoran-Victor Co., of Cincinnati, the first part of the firm name was misspelled as "Corrocan."

Clemens Automobile Co., distributor of Overland and Willys-Knight cars, held a party for their employees Sept. 21. The retail sales department acted as committee on arrangements and entertainment. The sales room was decorated with cornstalks and pumpkins and autumn flowers, and refreshments were served. After a short "pep" meeting with talks by Vern Orr, general manager, and H. C. Carr, sales manager, the evening was spent in dancing. This is the first of a series of monthly meetings which this organization plans to hold during the winter.

H. J. Strack has secured the franchise for the distribution of Columbia cars in central Iowa. The new firm will be known as the Strack Motor Sales Company and will be located in a new building at 1429 Locust street, Des Moines. Frank K. Taylor will be sales manager.

The Reinhard-Roberts Auto Sales Co., Toledo, O., has been chartered with a capital of \$10,000 to operate a sales agency and service station.

Four States Combined In New Willys-Overland Plan

20,000 Cars to Be Sold in Coming Year Is Hope of New Company

TOLEDO, Oct. 7.—The grouping of the entire wholesale territory in Ohio, with parts of Michigan, Indiana, Kentucky, and Pennsylvania, under the head of R. L. Butler, who has been head of the Willys-Overland branch at Toledo for six months is expected to result in the signing of a contract to sell 20,000 Overlands and Willys-Knights in that territory during the coming year.

The big territory will result from the amalgamation of the Toledo and Cleveland wholesale districts.

This one contract will be the largest sales instrument ever signed by the Willys-Overland Co., here and will involve about \$15,000,000 worth of business or about one-eighth of the total for a year.

The headquarters of this new wholesale division will be located in the Administration Building of the company here rather than in the branch headquarters.

The new alignment brings such important dealer points as Akron, Massillon, Athens, Zanesville, Canton and a number of other cities under the Toledo wholesale control.

120,000 STAR ORDERS ACCEPTED

NEW YORK, Oct. 6.—Out of 500,000 orders for cars for delivery by Aug. 31, 1923, Star Motors, Inc., has accepted 120,000. Of 10,000 applications for appointments as distributors and dealers, 1,000 have been accepted. While the Star is in production now at four plants—Lansing, Leaside (Canada), California and Long Island—deliveries are slow. It is expected, however that by the end of the first week in November the various plants will be up to the scheduled production and turning out 8,000 Stars a month. Contracts accepted call for the construction of 18,000 cars by the first of the year and it is thought this obligation will be met.

TO OPEN FIRESTONE RIM PLANT

AKRON, Oct. 5.—The new rim plant of the Firestone Tire & Rubber Co., of Akron, will be in operation within a month according to Harvey Firestone, Jr., with an initial productive capacity of 20,000 rims and 4,000 solid truck tire bases a day.

Alleging that the officers and directors wasted \$400,000 through mismanagement, Charles L. Thompson of Cleveland, O., a stockholder, has petitioned common pleas court to appoint a receiver for the Cleveland, Ohio, Rubber Corp., which was formed in 1918.

The Testor Manufacturing Co., Indianapolis, has changed its name to the General Piston Ring Co. There is no change in ownership, management, business policy or product.

Studebaker-Wulff Rubber Co., Marion, O., has increased its production to 300 casings and 500 tubes a day.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Garage Owners in Illinois Required to Register Cars

Q—We noticed in the last issue of *MOTOR AGE* something regarding the dealers and garage owners registering cars and a possible fine if you did not do so. Can you tell us whether this would affect the electrical and battery service stations as well as garages?

Section 38, Chapter 95a, of the Statutes of Illinois, entitled: "Garages—Record of License and Engine Numbers"—makes it the duty of every person "operating a public garage in this State" to keep for "public inspection a record of the license numbers and engine numbers of all motor vehicles taken in or held in charge by said garage for the purpose of selling, livery, storage or repair." It will be seen that the law applies only to persons "operating a public garage."

This is a recent enactment and so far there are no decisions on it from higher courts defining the scope of "public garage." If one operates a service station, without also doing a garage business—as taking in cars and keeping them for longer or shorter periods of time, I am of the opinion that the law does not apply to him. I understand the service station, to come under the law, would have to be classified as a public garage, which could only be done by showing that it did a garage business.

Evidently the legislature did not have the electrical and battery service station in mind when the law was framed and I think you will be safe in failing to keep such a registration. If any administration officer should think that you came under the law, and should have you brought before a court, said court would not deal harshly with you even if it did rule that the law applied.

Now the record required is the name and address of the owner of the car, the name and address of the one delivering the car to you and the license number and engine number of the car. The alteration or obliteration of the engine number is prima facie evidence of larceny of the car and the garage man is required to notify the sheriff or police and to hold any such car for a period of 24 hours, or until investigation has been made by the officials. However, this record is not necessary to keep when the car is returned a second time, for regular storage.

One guilty of violation of these requirements shall be fined not less than \$100 nor more than \$500 and the costs of prosecution and shall stand committed to the county jail until said fine and costs are paid.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by C. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by *MOTOR AGE* organization in conference.

While I do not think this law applies to the strictly battery service station, still the above are the salient points of the statute and every garage man should know them.

ADJUSTING STARTER ON 1920 MODEL 6-A ESSEX

Q—Give instructions for adjusting the starter on a 1920 model 6-A Essex car so that the gear will not start to revolve before it comes in mesh with the teeth of the flywheel.

1—The starting pedal, operated by the foot, controls a rod of rectangular section the front end of which is beveled. This beveled end of the rectangular rod releases a pin, which moves vertically, and this pin drops one of the brushes onto the starter commutator. The trouble experienced is doubtless in wear in this pin which should be replaced with one slightly longer, so that the contact at the brush with the commutator will not be made quite so soon.

2—What procedure should be followed

in removing the flywheel from this car?

2—Remove the floor boards and disconnect brake rods. Disconnect and drop rear end of propeller shaft and pull front end of propeller shaft out at the splined joint. Take out screws which attach flywheel cover. Remove transmission holding bolts and pull transmission and clutch assembly, all in a unit, backward and then drop in order to remove from the car. The bolts attaching the flywheel will then be accessible and the flywheel can be removed.

3—This car has no heating appliance to assist in vaporizing the gasoline. Do you recommend a stove of some kind and would this increase the mileage per gallon of gasoline? Where can such a heating device be obtained?

3—Later model Essex cars are equipped with a heating stove, which can be obtained from any authorized Hudson-Essex dealer, and can be installed on the car you have. A device of this kind will doubtless give increased gasoline mileage and the better vaporization will also result in reduced dilution of the crankcase oil.

4—There is a click in the rear axle of this car which sounds as if one or more of the teeth in the differential ring gear or pinion might be defective. Inspection of these gears, however, shows them to be O. K. This click is most noticeable when the car is on a grade so that the left side of the car is lower than the right and it is more noticeable at some times than others. This click is also more noticeable under conditions of heavy pulling than it is when idling, but can also be detected going slowly. What might cause this condition which can be noticed by holding either the gearshift lever or by touching the clutch pedal?

4—This condition, if not in the teeth of the gears themselves, is doubtless a defect in one of the four roller bearings used in the rear axle. Two of these are at either side of the differential and the other two are at the outer end of the axle. A broken roller or broken race would doubtless cause this condition and it would be well to remove and inspect all four bearings.

5—A 1919 model M Samson tractor has always given trouble. It is equipped with a water air strainer, Simms magneto and Kingston carburetor, just as it came from the factory. It will run fairly well at times but frequently chokes down just as though the fuel line had been clogged. Released from the clutch and allowing it to run idle, the engine will usually pick up again and run satisfactorily for a short time and then choke down again.

The fuel line is clean and the magneto gives a good spark. The carburetor also seems to be in good shape. Carburetor adjustment does not seem to be the trouble as it will run satisfactorily for some time then act as stated above with no change in carburetor adjustment. The valves are in good shape and the compression good. This engine usually idles well and has plenty of power when it does run well. Suggest a cause and remedy

Continued on next page

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

- Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.
- What departments are to be operated and how large it is expected they will be.
- Number of cars on the sales floor.
- Number of cars it is expected to garage.
- Number of men employed in repair shop.
- How much of an accessory department is anticipated.

Combined Filling Station and Garage

Q—I am a reader of your magazine and note that you have shown several drawings of garages and filling stations but have been unable to find any of a garage and filling station combined. I am operating a filling station and garage in separate buildings and am planning to build a new garage onto the present filling station. Any hint or sketch you could furnish would be greatly appreciated. Garage is to be 40 by 60 ft.—Country Club Auto & Filling Station, Houston, Texas.

You do not give the dimensions of your property, but judging from your sketch there is ample space. If this is the case you should not consider a building less than 50 ft. in width for garage purposes—by garage, we assume, of course, that you mean storage garage. In a storage garage a center entrance is most economical. It would be best to place the pumps at one side so that cars will not block the entrance while taking on gas.

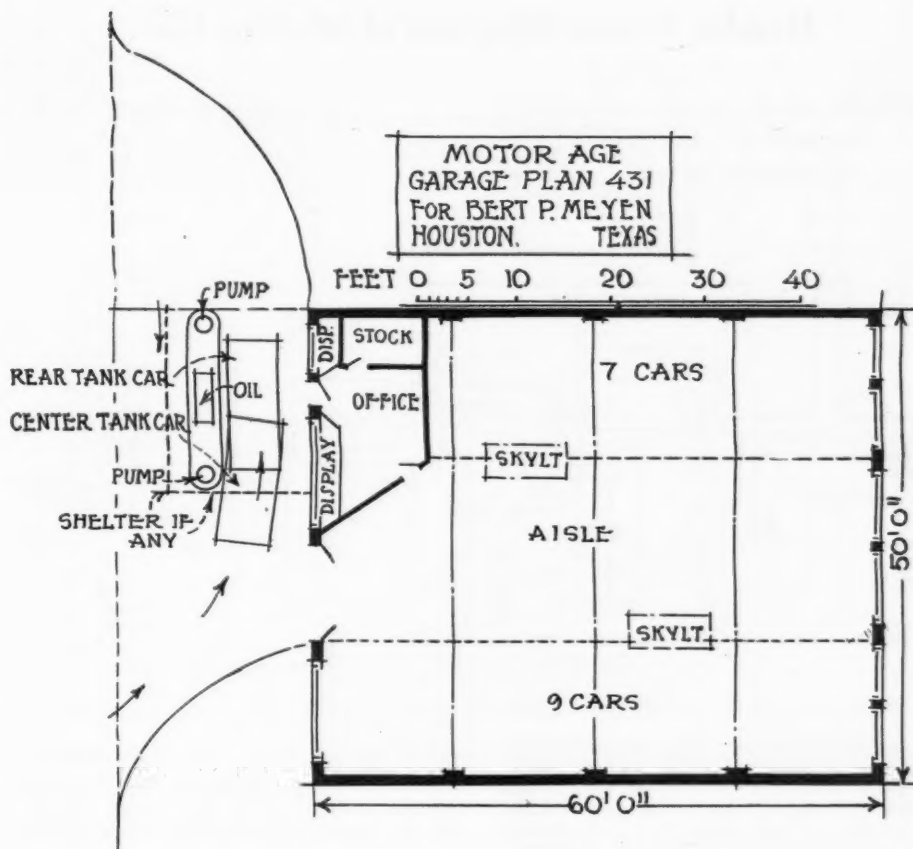
While windows at either end would afford sufficient light for storage purposes two small skylights, as indicated, would light up the center of the floor far better than all the side windows and would be well worth the cost. The roof should be supported by 3 trusses of whatever type desired, leaving the floor part free.

Continued from preceding page

for this trouble.—Geo. F. Thomas, Topeka, Kas.

5—Although we have no details of the construction of the air cleaner as installed on the Samson tractor, we are of the opinion that the trouble you have experienced is caused by a clogged air cleaner. We would suggest that you dismantle the air cleaner and thoroughly clean it of all accumulations of dust. Then try the engine. If this does no good, we would suggest that you temporarily remove the air cleaner and adjust the carburetor to the most satisfactory position with the air cleaner off. If the engine operates satisfactorily with the air cleaner removed it is sufficient cause to send it to the maker for repairs.

Would also suggest that you carefully examine the carburetor for a stuck float mechanism. That is, this float may be operating on a bent pivot which at times

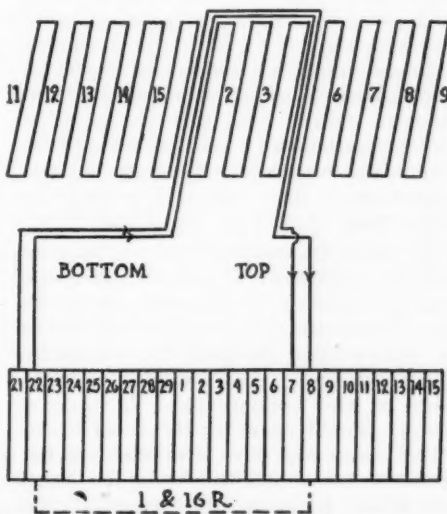


will cause the float valve to give either too little or too much gas to the float chamber.

AUTO-LITE TYPE G. D. GENERATOR ARMATURE DIAGRAM

Q—We would like to have diagram of the armature used in Auto-Lite type G.D. generators, as used on Overland cars, models 83 and 85. Is there more than one style of winding used on this type? Give size of wire, number of turns, slots occupied and proper commutator bars to attach coils.—A. L. Porter, Leonard, N. D.

A diagram of this armature is shown in the figure below. There are 15 slots and 29 commutator bars. There are two coils per slot. These coils being wound in pairs. The wire size is No. 17, insulation being enameled and single cotton



ARMATURE DIAGRAM G.D. AUTOLITE #100796

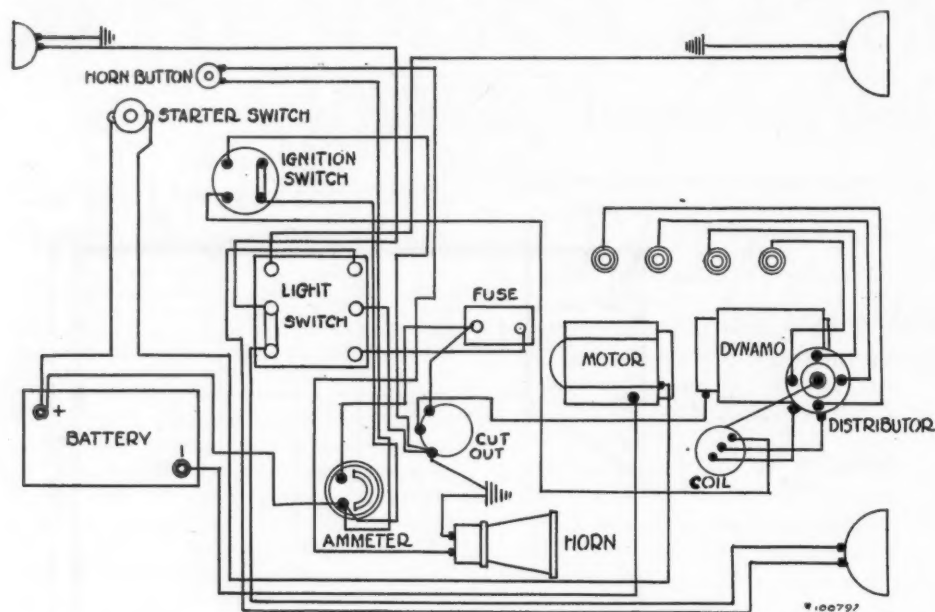
cover. The commutator bar No. 1 is in line with the end of slot No. 1. The coil leads that go in the bottom of the commutator bars are 9 and 10 bars to the left of No. 1, starting to count with No. 1 bar, while the leads which go in the top of the notches cut in the commutator are 7 and 8 bars to the right of No. 1, starting to count with No. 1 bar. Each coil should have 11 turns. It will be found that there will be one dead coil the ends of which should be taped up, this coil being put in to balance up the armature.

HOW TO DETERMINE THE MILES PER HOUR

Q—A Marmon 1922 model 34 has a gear ratio of 3.75 to 1, and uses 32x4½ tires. The height of the power curve is 2650 r.p.m. Tell me how to find the maximum speed when these factors are known. We are contemplating the installation of a 3.58 to 1 or a 3 to 1 axle, but wish to be able to determine what the results will be.—H. H. Hart, Eighth & Meridian Sts., Anderson, Ind.

The maximum engine speed the tire diameter and gear ratio being known, the speed in miles per hour is derived as follows: $D \times 3.1416 \div 12 \times R \div G$ equals speed in feet per minute. Where D is the diameter of the tire in inches, R is the maximum engine revolutions per minute, G is the rear axle gear ratio, then miles per hour will equal: Distance $\times 60 \div$ minutes, where distance is in miles and fractions of a mile. A deduction of from 2 to 5 per cent should be made to compensate for slippage if the actual miles per hour are desired.

Reader Wants Diagram of Monroe Car



Circuits of Monroe, Model M-2, 1916

Q—Publish wiring diagram of Monroe Roadster Model M-2, 1916. This has combination coil and switch in dash. We wrote the factory, but they were unable to furnish wiring diagram.—E. J. Boller, Prop., Boller's Machine Works, Gowanda, N. Y.

We are showing herewith diagram of the model M-2, 1916 Monroe. This does not however have a combination coil and

switch in the dash. We think possibly you refer to combination lighting and ignition switch and if this is the case it may be that the M-3 model is the one in which you are interested. If this is the case, you will find a wiring diagram of it in the September 7, 1922, issue of Motor AGE.

WHAT IS WRONG WITH THIS GENERATOR? IS IT GROUNDED OR WHAT?

Q—We have a Birch car equipped with Disco generator with a fixed third brush and on this generator the charging rate is only 4 amperes. We have cut a slot in the third brush holder and moved the third brush in the direction of rotation but have only been able to increase the charging rate from 4 amperes to 6 amperes which is not enough to keep the battery charged. Due to the construction we cannot cut the slot any farther so that this is the maximum current that can be obtained in this way. The voltage at the terminals is 6 and the armature and field windings test O. K. The mica on the commutator is undercut and the brushes appear to be O. K.

We are enclosing a sketch of this generator together with direction of rotation, brush position and field connections. We have also tried out the generator by connecting the field windings from live brush to grounded brush and omitting the third brush and under these circumstances the generator charges 15 amperes and the current increases with the car speed. We found, however, that with this much charging current the generator would get excessively hot and would no doubt burn up if we ran it very long this way. What is the cause of this trouble and how can it be corrected?—A Reader.

We are showing herewith a diagram made from sketch submitted by the reader. We have also shown the live or insulated brush as positive and the grounded brush as negative. Under these conditions, the opposite point on the commutator from the positive brush would also be of positive polarity while

the point opposite to the negative brush would be negative. As a general rule the third brush field connection is from any main brush to the following third brush tracing in the direction of rotation.

We accordingly feel that the dotted position shown would be more accurate for the third brush and the location as indicated is doubtless due to the reader making a hurried sketch and not locating the third brush in exactly the right position. This is, however, a technicality perhaps and does not affect the problem under consideration. Inasmuch as the generator operates as a plain shunt machine generating 15 amperes or more, it would show that both the armature and field windings are substantially O. K. Also inasmuch as the machine has been designed with a fixed third brush it is no doubt satisfactory under ordinary conditions and we accordingly have but one suggestion to offer and that is that the third brush holder is grounded.

Referring to the sketch it will be seen that the negative brush is grounded and that accordingly the opposite points on the commutator will be grounded due to connections through the armature which practically short circuit opposite sides of the commutator. If then a ground should occur in the third brush holder, we would have two points on the armature grounded, one being the negative brush position and the other the third brush position and this would

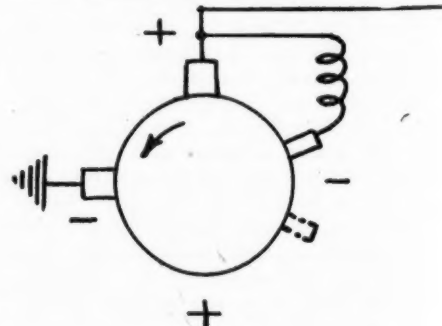
short out a portion of the armature and materially weaken its action, possibly accounting for the reduction in current from 10 or 12 amperes to 4 or 6 amperes. We would accordingly suggest removing the field connection and the third brush and using 110 volt lamp line to test the third brush holder for grounds.

We have only one other suggestion to make in experimenting with this job, and that is to take the third brush end of the field circuit and, with the generator operating on a test bench, touch this free end of the field circuit, to a point on the commutator opposite the negative brush so that the rubbing of the wire on the commutator will serve instead of a brush. This would eliminate any trouble due to defective brush holder. The contact made in this way can now be moved gradually one way or the other to see what position on the commutator would give good results.

We hope that the trouble as above indicated is in the third brush holder being grounded, but if this is not the case and the trouble cannot be located the machine can be used as a straight shunt machine by connecting one or two resistances in series with the shunt windings.

A two-gang lighting switch is suitable for use in connection with such a home-made regulator, for controlling generator output, when no special regulation is used. Such a switch is connected, with the two gangs wired in series, and this assembly is then placed in series with the field circuit. The next step is to make up two resistance coils of iron or german silver wire, one having twice as much wire in it as the other so as to have double the resistance. These two resistance coils are then connected across the two gangs of the switch.

With the two sides of the switch closed, the field current is at its maximum strength which is suitable for low speed operation. As the car speed increases, however, the charging current may become too great. Opening one side of the switch will now throw a certain amount of resistance into the field circuit and lower the generator output. Opening the side of the switch across which we have the larger resistance, will make a greater reduction in the charging current, while having both sides open will give maximum reduction of charging current.



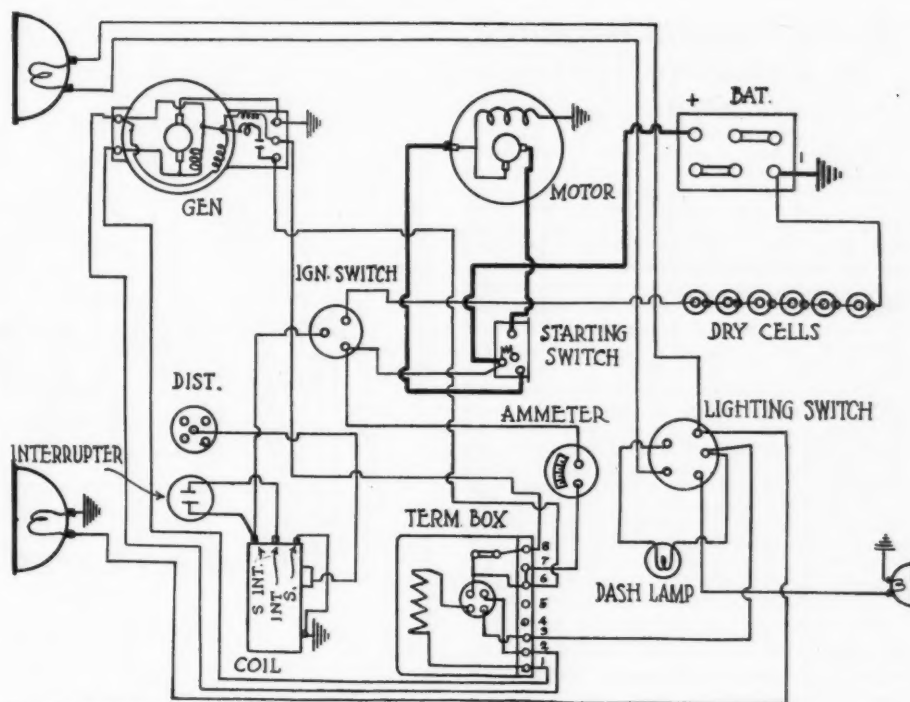
READERS SKETCH OF DISCO GENERATOR ON BIRCH CAR 100808

Regal Valve and Ignition Timing

Q—Publish wiring diagram of Regal using Atwater-Kent ignition and Rushmore starting and lighting system. We are unable to give exact date, but believe it is 1915 or 1916. Also give ignition and valve timing.—Albert G. Cohn, Independence, Mo.

1—Wiring diagram is shown at right. The valves are timed with the exhaust closing 5 degrees after top dead center and the intake valve opening 10 degrees after top dead center. The ignition should be timed on top dead center with the spark advance lever in the retard position. This is the standard setting and is correct unless it is found that the car lacks power at high speed. If such should be the case it is possible to set the ignition as much as $1\frac{1}{2}$ inches before center on the flywheel.

Under these circumstances, however, it would be necessary to give a quick upward jerk on the crank in starting or would be advisable to let the starting motor get the engine spinning before turning on the ignition. This practice of timing the engine $1\frac{1}{2}$ inches advance on



WIRING DIAGRAM 1915 REGAL MODELS D&R. 100728

the flywheel for the retard position is followed by the Franklin company, so that

best results will be secured at high speed.

Good Books on Electrical Systems in Demand

Q—Give us the name of a good service book on the late automobile generators.

1—This information will be given by letter.

2—How can you tell when a generator has reversed polarity?

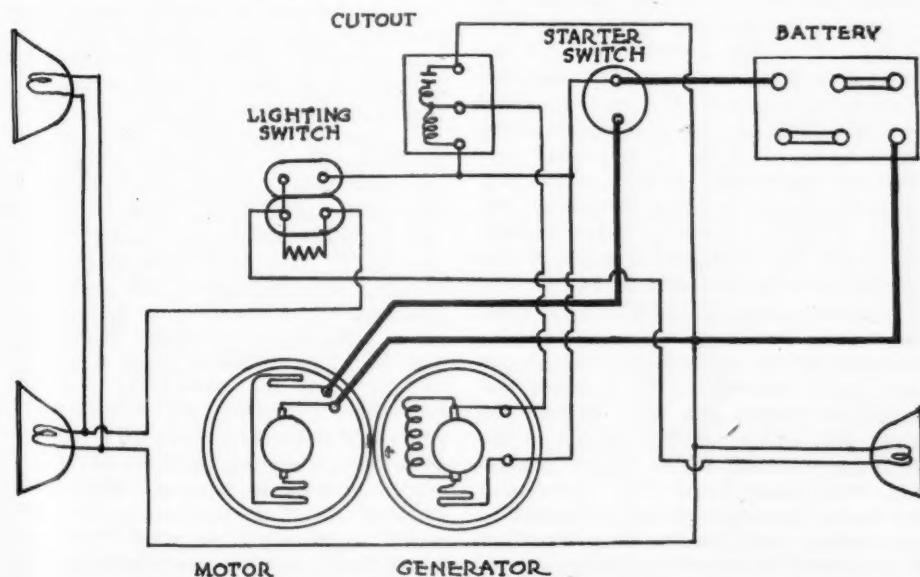
Such a generator will cut in the wrong way and knock the ammeter needle away over to the discharge side of the scale. With some cutouts, however, the action is slow enough so that the rush of current through the generator will reverse its magnetism and the generator will then automatically generate in the re-

verse direction and everything will be O. K. With other cutouts the points will vibrate and burn and the condition does not remedy itself. In installing a generator on a car, however, it is not necessary to worry about the polarity, as it is only necessary to close the cutout points once by hand to automatically give the generator the right magnetism for the battery that is on the car.

3—What will cause sparking in between commutator bars on a Ford generator? Mica and dirt have been cleaned from between the bars and new brushes have been installed. While testing the generator to see if it would rotate with a six-volt battery, it would spark between commutator bars and there is one position

where the armature would get, in which current from the battery would not cause the armature to turn. When the generator was put on the car it would not generate.

3—Failure of the armature to turn in certain positions and sparking between bars, also failure to generate, points toward an open armature and we would suggest your getting in touch with various concerns making armature testing equipment, in case you figure on doing any amount of electrical work. A simple test on this armature can be made with a dry cell and an ammeter, connected in series, with test leads touched on adjacent commutator bars. In working around the armature you will then, no doubt, find a pair of bars where the reading on the ammeter is much lower than at other points, and if this is the case, a new armature should be tried.



WIRING OF 1915 KRIT DISCO SYSTEM #100804

WIRING DIAGRAM OF DISCO SYSTEM ON KRIT CAR GIVES INTERNAL AND EXTERNAL CIRCUITS

Q—Give wiring diagram of Disco electrical system as used on a 1915 Krit car. We would like both internal and external circuits shown. This is a two-wire system having three wires from generator to cutout.—L. J. Antony, Chicago, Ill.

The diagram requested is shown herewith but you will note that, while there are three wires on the cutout, only two of them come from the generator, the other one being connected to the battery. If it should be seen advisable to install an ammeter it could be connected by cutting the small wire which comes from the starter switch and inserting the meter at that point.

Extra Ground Required by Defective Starting Switch

Q—We have a 1916 Pullman equipped with Splitdorf Apelco electrical system and recently we have been unable to make this outfit charge the battery with only one ground on the starting switch. We have checked the wiring according to the wiring diagrams of the Automotive Publishing Company and have tested the generator and everything apparently is all right but the current backs up in the generator and causes it to sing until we put the other ground on.

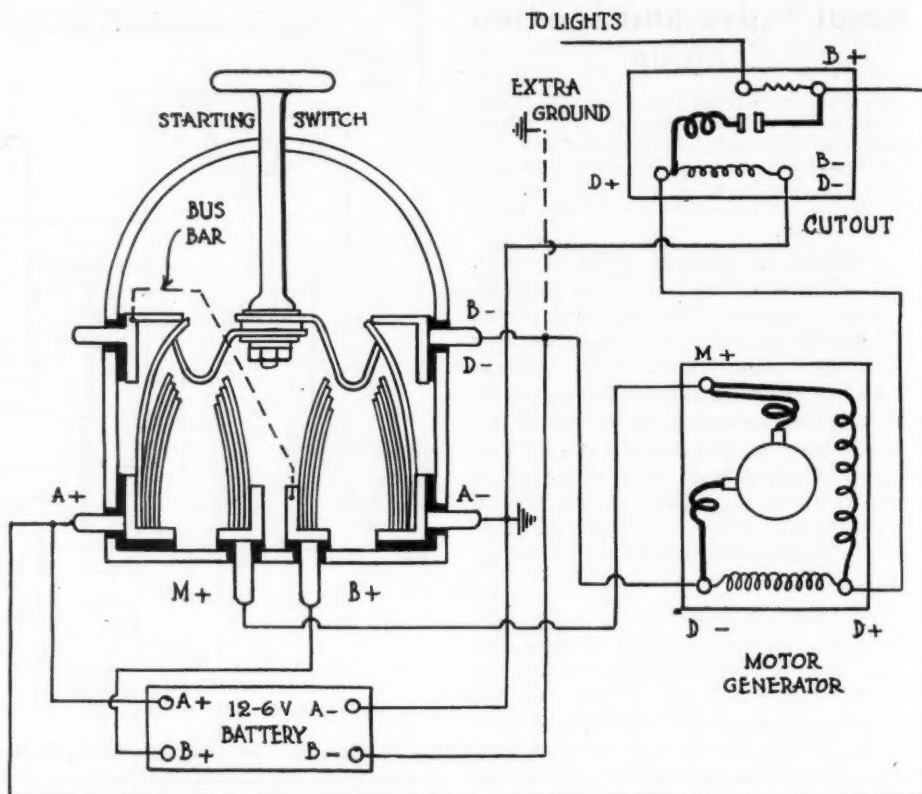
This ground causes a very small amount of discharge according to a voltmeter. We have run the car for quite a period with this ground on and operation seems to be satisfactory, the generator charging about 15 amperes which is the same current as was obtained from it on a test bench. We are attaching sketch which shows the regular ground and the location of the extra ground which we put on.—F. E. Thatcher, Thatcher Brothers Machine Shop & Garage, Mattoon, Ill.

The cause of the trouble will doubtless be apparent when the action of the starting switch is studied. We are accordingly showing a diagram in which the detail of the starting switch is carefully given and as shown, with the button in the up position, the two hook shaped arms at the lower part of the starting switch button hold two heavy brass fingers in contact with two "L" shaped brass extensions. At the right of the starting switch it will be seen that this operates to connect the A minus terminal to the upper terminal which is marked B minus and D minus. At the left it connects the A plus terminal to the terminal just above it.

This upper terminal has no external connections but inside of the starting switch and back of the other mechanism is a bus bar or copper strap which connects the unmarked terminal to the B plus terminal. This is indicated by the dotted line in the sketch. These connections, as seen, connect the two halves of the battery in parallel, the A plus and B plus terminals being connected while at the other side of the switch A minus and B minus terminals are connected.

If the switch is doing its duty as above described the ground at the A minus terminal would be connected through the switch to B minus terminal. As you found it necessary to install the extra ground shown by the dotted lines it would seem to indicate that this internal connection is not being made and we would accordingly suggest that the starting switch be taken apart and checked up to see that it makes the connections as above described. Where you state in your letter that a voltage reading was taken on this ground connection we would suggest that a current reading with an ammeter would be better and it is possible that you refer to an ammeter being used to check the current flowing in this circuit. But, as you obtained satisfactory results the connection must be all right.

When the starting switch is depressed the two hook shaped affairs at the bot-



SPLITDORF APELCO ON 1916 PULLMAN -100798

Wiring of starter and generating circuits on cars equipped with Splitdorf Apelco system

tom of the starting switch button release the heavy brass contact so that the parallel connection is broken. As the hooks are moved downward they make two separate and distinct connections. One is from the A plus to the M plus terminal and the other is from the B plus to the A minus terminal which two connections put the two halves of the battery in series giving 12 volts, and at the same time connecting to the starting motor.

At this point there is one thing that we do not understand and that is why your extra ground connection did not burn up as in starting you have the B minus terminal grounded and also the A minus terminal grounded which by the action of the starter switch is connected to B plus. We accordingly have both terminals of the B battery grounded which should cause a short circuit sufficient to burn up the extra ground wire that you connected. It is of course possible that this wire was capable of carrying a heavy current for a few seconds and if the engine started promptly it may account for absence of trouble.

The circuit which was broken by trouble in the switch was from the D plus terminal of the motor generator through the cutout winding to the A minus terminal or ground and then through the right side of the starting switch to the B minus terminal of the motor generator. This circuit being broken prevented the motor generator being connected to the battery and running open circuited it generated an enormous voltage in itself which caused the singing action you describe. In checking the starting

switch make sure that the bus bar is not burnt out and if it is an outside connection can be used instead of replacing this connection.

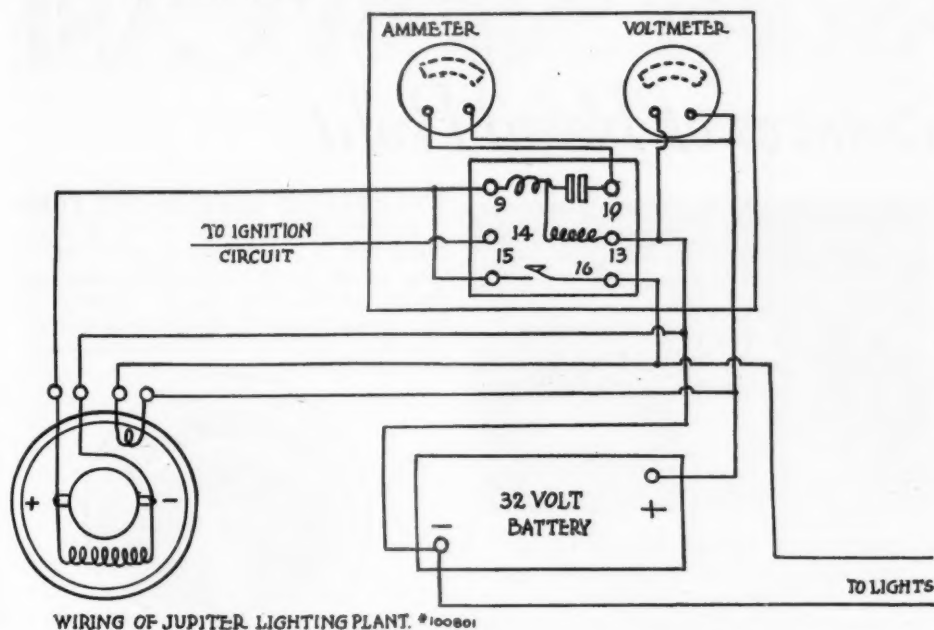
WHAT WILL HAPPEN TO A 6-VOLT MOTOR USED ON 32 VOLTS

Q—We have a 32-volt lighting plant and a 6-volt Westinghouse starting motor. We wish to know if it is possible to use the starting motor for operating an emery wheel, taking power from the 32-volt battery, and would also like to know what size wire to use. A six-volt battery works very well operating the starting motor when running the emery wheel.—C. H. Woodson, Greenville, S. C.

The 32 volt battery will be unsuitable as it would give too great a speed to the starting motor and would draw excessive current. You can, however, use three cells of the 32 volt battery with good results, except that those three cells will become discharged more rapidly than the others. To avoid trouble from this condition, it would be necessary to have some sort of clip with which you can quickly change the connections to the battery. You could then operate first on three cells and then on the next three, changing the connection so that no one set of cells would be rapidly discharged. You might for example, make it a practice to shift the connection one cell everytime the emery wheel is used or you could shift three cells at a time so as to use an entirely new set of cells.

In regard to the wire size would recommend No. 2 starting cable. Slightly smaller size might be used if it was found that it did not overheat and sufficient power was obtained to operate the emery wheel.

Lighting Plant Diagram Made to Order



Lighting current with these circuits increases generator output

Q—Some time ago we picked up a Jupiter 30-volt 15-ampere, D.C. generator with switchboard. Part of the wires were off of the switchboard and all were removed from the generator when it came into our hands. The ammeter and voltmeter were made by the Reliance Instrument Co., of Chicago, and the cutout switch was made by the Hartman Electric Co., Mansfield, Ohio. We would like some assistance in regard to wiring up this outfit. The generator name plate shows the makers to be Dealers Electric Light Co., of Chicago, but a letter addressed to them came back to us undelivered. The generator when directly connected to a 32-volt lamp causes it to burn dimly.—W. M. Organ, Jr., Liberty, Tenn.

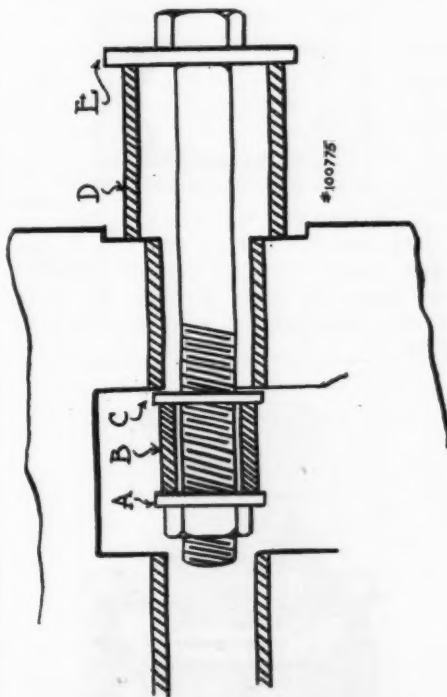
If the generator is in good condition the burning of the lights dimly would show that the speed is not sufficient and it should be driven faster. We would suggest that it be checked with a voltmeter to see whether you can get 35 or 40 volts, as this would be necessary to take care of charging a 32 volt battery.

We are not positive that we know the exact type of Hartman switch that you have, nor are we sure of the generator model, but we assume that the switch is as shown in the diagram and that the generator is a machine having both shunt and series winding, which is common practice with lighting generators of that type. We have made the diagram accordingly and by tracing it you will see that current from the positive side of the battery goes through the series windings and then to Nos. 16 and 15 terminals to positive generator.

Current to the lights going out from positive battery must also go through the series winding of the generator, which helps to boost its output. Operation of the generator sends current from its positive terminal through No. 9 and through the heavy winding of the cut-out and the fine winding to No. 13 and back to the negative generator. When

the cutout closes current goes through No. 9 and the heavy winding in the contact to No. 10 terminal and through the ammeter to positive battery. The ammeter will, accordingly, show all of the output of the generator, so that current to battery will be generator current minus current going to lights.

When you first make the connection, if the starting motor does not operate very well try reversing the connections to the series field, as it may be that you would get those the wrong way at first. If the circuits are not exactly suitable for the equipment you have we would be glad to have additional information showing generator construction and cut-out terminals



This device removes Wrist Pin Bushings

with marking upon receipt of which additional information will be prepared. No. 14 terminal is for the purpose of grounding the magneto or connecting positive battery to battery ignition.

WET COIL BOX CAUSES HIGH TENSION LEAKAGE

Q—We have a suggestion to offer in regard to the trouble experienced by the Reilly Garage of Reilly, Ohio, which was described on page 42 of the August 24 issue of Motor Age. We believe the trouble will be found in or near the coil box. The coil box may have become wet and dirt may have sifted in between the coil box and the dash, which will form a more or less conducting path for the high tension current. The spark will follow this path part of the time rather than jump the spark gap in the spark plug which is under compression. It is also possible that a light wire may be lying close to No. 1 and 2 high tension leads and the spark may be jumping to this lighting circuit.—LeLoup Garage, LeLoup, Kan.

This is a very likely explanation of the trouble being encountered but would not be possible if, in the test made as suggested, it was found that the sparks were jumping regularly at all plugs. In case however the sparks were found to be missing occasionally, it would be the logical place to check up in view of the fact that other parts of the ignition system had been replaced. Another suggestion which was received, from another subscriber, was to the effect that the coil box might be causing the trouble due to broken leads, or connections which had become unsoldered.

REMOVING FORD WRIST PIN BUSHINGS

Q—We recently noticed a "Clearing" article in Motor Age about removing wrist pin bushings from a Ford system, in which it was mentioned that there is often some difficulty due to warping or distorting the pistons. The method indicated in the sketch below can be used without danger of distorting the pistons. A bolt is put through from the outside as shown and washer A and C and collar B are used inside the piston, while collar D and washer E are used outside. Collar D is large enough to allow the bushing to go inside, while washer A and C, together with collar B are small enough to pass through the hole in the piston in which the bushing is inserted. By holding the nut and turning the bolt the bushing will be removed. The same general method can be used in putting bushings in except that collar D is omitted, while washer E is used inside the piston and either washer A or C is used outside.

We have run across another Ford kink in regard to determining whether the oil pipe is stopped up or not. This is to remove capscrew from front end of oil pan and start up the engine. If oil flows out the pipe is in good condition.—W. G. Landon, Heath, Mass.

Editor's Note—Motor Age wishes to express appreciation for the above question. Another rough way of checking the operation of the oil pipe in a Ford engine is to remove the breather's cap and operate the engine. By looking down through the breather a flow of oil will be seen if the oiling system is working.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

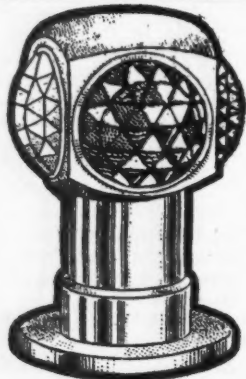
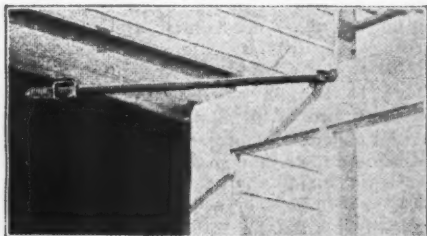
FARGO ASH RECEPTACLE

Made in either a dash or side wall model, the Fargo Ash Receptacle serves a convenience to the smoker. Pressing the button shown at the upper right in the cut opens the lid, affording a ready place to put ashes and stubs. List price, \$3. Fargo Co., Inc., Ripon, Wis.



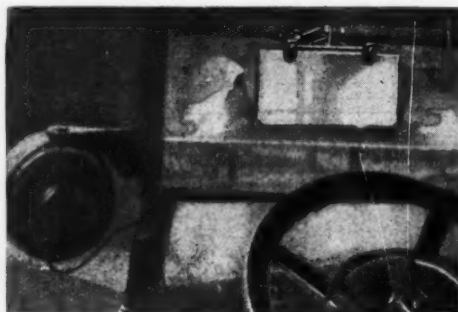
A. A. A. DOOR HOLDER

The cut shows the A. A. A. Door Holder "in action." Its purpose is to hold the doors of garages open while moving cars in or out. Simply opening the doors throws the catch into place and to release it, it is necessary to open the doors an inch or two more when the gravity latch will be disengaged. \$3 per pair. Knowlson-Stevenson Co., Ann Arbor, Mich.



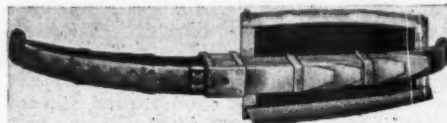
ARJO 3-WAY PARKING LIGHT

The Arjo 3-Way Parking Light is made by the Arjo Mfg. Co., 114 W. Mt. Royal Avenue, Baltimore, Md. It is three faced with red to the rear, green to the side and white to the front and made of solid metal die casting heavily nickeled.



SECURITY GLARE ELIMINATOR

The Security Glare Eliminator is fastened to the windshield as shown and can be adjusted to any position desired. It is made in any shade of glass and to fit all kinds of cars. \$2.50. Security Mfg. Co., 263 Central Avenue, Rochester, N. Y.



RED TIP AUTO SPRING PROTECTORS

Made of a special leather process and especially treated to retain lubricants, the Red Tip Auto Spring Protectors have been placed on the market by the Snappee Co., 1-11 Broadway, Chelsea, Mass. (Special prices are quoted on various cars.)



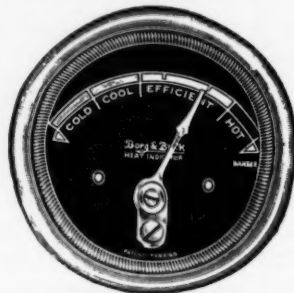
NATIONAL BATTERY CASE

The National Carbon Co., Inc., Cleveland, announces a new steel container for their Columbia Battery No. 1461, which heretofore has been built in fiber cases.



WEED SAFETY BUMPERS FOR FORDS

This bumper is made of 1 1/4 in. spring steel and is furnished as shown in the cut. Front, black enamel, \$13; rear, \$14; front, nickel \$14; rear, nickel, \$15. American Chain Co., Bridgeport, Conn.

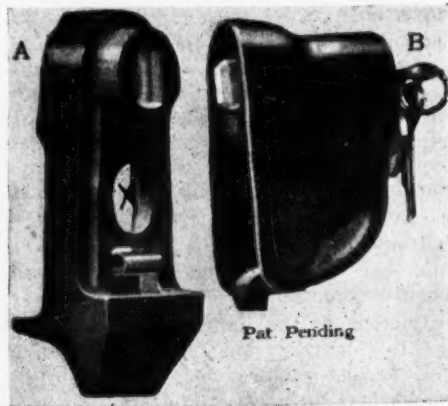


BORG & BECK HEAT INDICATOR

The heat indicator records the temperature existing in the engine on a dial gage installed on the instrument board. The actuating unit is clamped directly against the engine and contains a sensitive thermostat which is small in size but positive in action and any slight variation of the temperature of the engine causes it to expand or contract in direct proportion to the degree of heat or cold. The temperature ranges are designated on the dash indicator by contrasting colors. Indication on the dash is effected by a small gear segment and pinion which is self-connected when a turning motion is given to a flexible shaft, which connects the pinion with the pointer on the face of the dial. Borg & Beck Co., 920 South Michigan Avenue, Chicago. Price, \$8.50.

DETROIT TIRE LOCK

The cut shows this lock in operation. Part A is bolted onto the carrier, the bolt coming through at part X. Part B



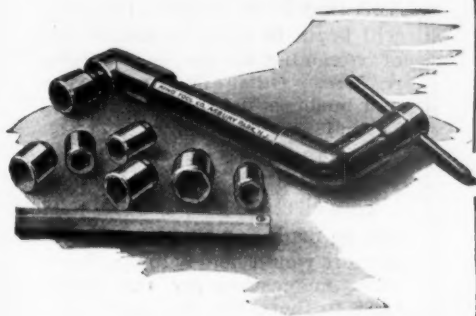
then snaps on over A and is locked. The lock is a regular cylinder Yale type, two keys being provided with each lock. \$3.50. Detroit Carrier & Mfg. Co., Constant and G. T. R. R., Detroit, Mich.

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

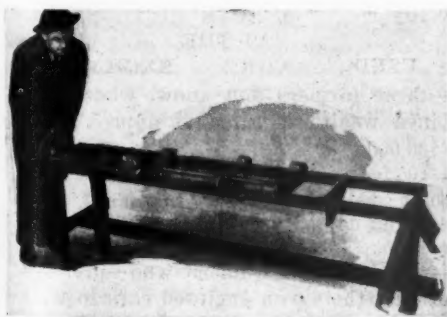
ONLI-1 SOCKET WRENCH

This is a socket wrench using two level gears, one on the handle shaft turning the main shaft in the tube, and in turn the socket shaft. If the nut is too tight to respond to the turn of the handle, the whole wrench can be made rigid from handle to socket by a simple adjustment of the socket pin. A set of six sockets fits sixteen sizes of bolts and nuts and there is an extension bar for unusually inaccessible places. King Tool Co., Asbury Park, N. J. Price, \$7.50.



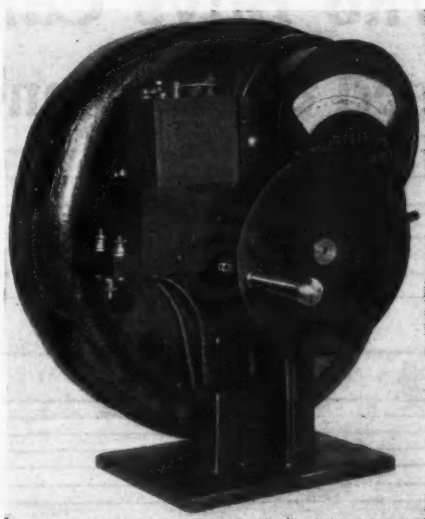
ERICKSON GARAGE PRESS

Erickson Garage Press is made for removing tight gears or bearings in automobile repair work. It is made of steel and iron, screw of special stock. The screw is threaded through a 4 1/4 inch block, insuring against stripping the threads. The horizontal design of the press, permits gears to be pressed on or off with ease and accuracy. Erickson & Olmstead, Charlevoix, Mich.



ALLEN COIL TESTER FOR FORDS

The device uses genuine Ford magnetos and magnets and the coil is placed where it is easy to get at. It will test the magneto in the car and has a separate connection for horn and spark plugs. An alternating current ammeter registers the current output. The price without magnetos and magnets is \$53. Allen Electric Mfg. Co., 2987 Franklin Street, Detroit, Mich.



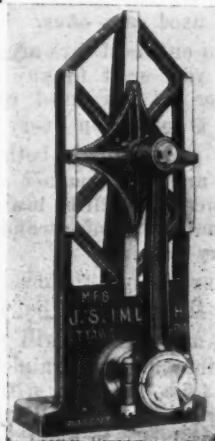
GELLMAN ADJUSTABLE END WRENCH

This wrench has an adjustable opening which adapts it to a wide range of nut sizes. It is made in 6, 9 and 12 in. sizes. Gellman Wrench Corp., Chamber of Commerce Bldg., Chicago.



TWISTED CONNECTING ROD ALIGNMENT JIG

A tool that will test connecting rods both ways at the same time and which will magnify any errors that exist. Price includes one stock mandrel and indicator. Mandrel sizes to 2 3/8 in. \$5.50. Indicators, sizes to 1 1/4 in., \$4 each. A Ford special Twistest price \$12. J. S. Imlach, 324 Catherine Street, Ottawa, Canada. Price, \$24.



WAYNE ADJUSTABLE REAMERS WITH PILOTS

Wayne Adjustable Reamers are made with every part interchangeable. The pilots are accurately ground to suit the work, any size being furnished. The method of attaching the pilot to the reamer is said to insure it being concentric. Prices vary with the sizes required, running from \$1.80 to \$3.30. The price of the pilots is from \$.75 to \$1.10. Set No. 10 which consists of seven reamers, ranging in size from 19/32 to 1 3/16 is furnished in an oak case as shown in the cut and is priced at \$40, complete. Wayne Mfg. Co., Waynesboro, Pa.



DAVIS REAMERS

Davis Reamers are offered in a wide variety of types and sizes for production and repair work. Locking and adjustment of the taper blades on the expansion reamers is accomplished by means of hardened taper pins; no individual blade adjustment screws are used. A wide range of expansion is secured ranging from .026 in. on the 3/4 in. size to .184 in. on the 3 in. diameter reamer. Blades are removable for sharpening.

The group I reamers are equipped with a micrometer dial for instant reading of the reamer size. The group II reamers are substantially the same but are not fitted with the micrometer feature. Line reamers are of the built up type and can be assembled with any number of cutting elements on one bar. The construction of the hand reamers permits the use of a floating guide sleeve which is of value in many automotive repair reaming operations. The Davis Boring Tool Co., St. Louis, Mo.

Some Suggestions for Writing Effective Advertising Copy

DEALERS will find the preparation of advertising copy, an interesting part of the day's routine. It is the part of your work that puts you in closer touch with owners and prospects and often is the cause of you putting your fingers on the cash register buttons and listening to the tinkle.

"The more you tell, the more you sell," is the message of a big newspaper to its advertisers and this is true, but perhaps you have in mind a series of short ads which you want to make as unconventional as possible. You want simply to be human and brief.

The automotive dealer, in many cases, has an idea that writing advertising copy is a hard job and in this he is wrong. You are the one who best knows what you want to tell to your customers and prospects and the more of yourself that is in your advertisements, the greater will be the returns.

Leaving it to a clerk is the incorrect way. If you will take a pencil in hand and a scratch pad and tell the customer about yourself and your business, you will have accomplished a whole lot more than by getting someone who does not know what conditions are in your establishment, to write you a series of ads.

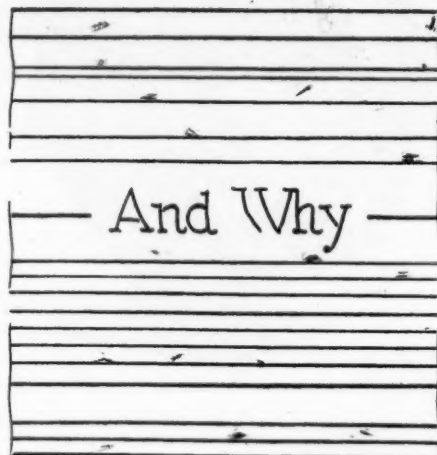
Many successful automotive advertisers say that the reason for their success is that they do not confuse themselves and their readers with more than one item at a time. If you would sell a spotlight, sell it and until it is sold, don't try to get a prospect interested in a spare tire and a bumper, too. You will be apt to mix your reasons for asking him to buy and he will be apt to allow his ideas to spread and walk away without purchasing.

And, too if you would sell used cars through short ads, pick out one feature at a time and sell it. When you have done this, a summary might be made, stating briefly, every feature of the car and to begin with, an introductory ad having to do with the policy of your used car department should prove effective. Here are some suggestions.

Selling used cars is a part of our business and like all other departments is handled by experts. If you are in the market for a used car and want one that is in perfect condition at the price you have to pay, then you will want to see our offerings.

Do you realize the comfort there is in owning an automobile that gives the driver the assurance of success-

Who Buys Cars At The Used Car Exchange



Special _____

Signature _____

An electrotype adds distinctiveness and variety

ful operation that our reconditioned Runwells with reground cylinders, new pistons and all wearing parts replaced, give! Our used cars are right in workmanship, price and performance ability.

If you think that we have not made our used cars models, in appearance as well as in workmanship, come in and look over the really beautiful paint work that has been done on them and see the condition of the upholstery. Comfort, ease of operation and assured performance at the RIGHT price is what our used cars offer.

Prices of our used cars are RIGHT. Whether you want to pay \$100 or \$1,000, one of our used cars will give you a return on every penny's worth of your money, both in appearance and performance and the maintenance cost will be low because the original work of reconditioning is the very best.

There are many features in our used cars that we could list here but operating one of them will prove to you that they are real values. Every trip you take in them will reveal something else which will make you say, "I was lucky to get this car at the price I paid for it."

Another suggestion on short ads is contained on this page in the electrotype, "Who Buys Cars at the Used Car Exchange?" Each week, the dealer can tell of three people who bought cars on the week previous and the reasons why they bought.

This sort of thing adds distinctiveness to the dealers' advertising and offers an opportunity for a little human interest. The names of three well known citizens, say a doctor, a farmer and a business man and their reasons for believing that in buying a used car from you, they have bought a real value, will begin to create a similar kind of reasoning on the part of other readers. Other doctors, farmers and business men will be appealed to and the mention of a woman who has bought a car will also prove effective.

This electrotype or a similar one can be made for about \$6. At this price it would be 5½ ins. wide. Another suggestion for the electrotype, in the event the dealer wants to use it in a wide scope of advertising, is to have a border made that is different from the regular run of borders in your local newspaper and have a monogram or lettering of some kind on it that will once mark it as your advertisement.

Having the center of the electrotype left open or mortised, allows for type being set in the center. This will make it possible for the dealer to change his copy as often as desired and still hold that distinctiveness that attracts.

Inserts will read something like this:

WHO BUYS CARS
AT THE
USED CAR EXCHANGE?

—three farmers you know, whose combined wealth is rated at approximately \$100,000.

—twelve salesmen who since making their selection have increased their earning capacity on an average of 25 per cent.

—two society women who preferred driving their own enclosed cars to walking in rainy weather.

(Names on request)

AND WHY

—because it is an established fact that vehicles placed on the floor of the Used Car Exchange for sale, are as right as new, and will be serviced as though they were new.

—because the cars we sell give an unusually high percentage of return for investment made.

Special Saturday—1921 Buicks.
Signature _____

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

St. Paul.....	Automobile Dealers' Assn. at the Auditorium	Oct. 11-14
Detroit	Enclosed Car Salon at General Motors Bldg., Detroit Automobile Dealers' Assn.	Oct. 17-21
Pittsburgh	Twenty-fifth Annual Automobile Show	Oct. 14-21
Wash'gton, City of	Enclosed Car Salon.....	Oct. 21-28
Los Angeles	Automobile Show, Motor Car Dealers' Association	Nov. 11-19
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.....	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York.....	Eighteenth Annual Automobile Salon	Dec. 3-9
New York.....	National Automobile Body Builders' Show	Jan. 8-13
New York.....	Annual Show	Jan. 6-13
Cleveland, O.....	Annual Winter Show, Cleveland Automobile Mfr's and Dealers' Assn.	Jan. 20-27
Brooklyn, N. Y....	Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Association	Feb. 24-Mar. 3
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Minneapolis, Minn.	Annual Show	Feb. 3-10

CONVENTIONS

Santa Barbara	Annual Convention, California Automotive Trades' Assn.....	Oct. 16-17
Atlantic City.....	Motor Accessory Convention and Show	Oct. 16-17
Chicago	Nat'l Association of Farm Equipment Manufacturers	Oct. 18-20
Washington	Second Annual Conference of the Highway Education Board.....	Oct. 26-28
Chicago	Annual Meeting Automotive Equipment Association	Nov. 13-18
Toledo	Annual Convention of the Ohio Automotive Trades' Assn.....	Dec. 6-8

FOREIGN SHOWS

London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

San Carlos, Calif.—	500-Mile Armistice Day Race.....	Nov. 11
Los Angeles, Calif.....	.....	Nov. 30
San Diego, Calif.....	.....	January
Ann Arbor, Mich.....	.....	Jan. 29-Feb. 3
Lansing, Mich.....	.....	Feb. 5-10
Kalamazoo and Flint, Mich.....	.....	Feb. 12-17
Grand Rapids and Mt. Clemens, Mich.....	.....	Feb. 19-24
Muskegon, Mich.....	.....	Feb. 26-Mar. 3
Port Huron, Mich.....	.....	Mar. 12-17
Battle Creek, Mich.....	.....	March 19-24
Alpena, Mich.....	.....	Apr. 2-

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

Be White

A dealer friend of ours the other day was discussing with us and another dealer conditions in the trade. These two men talked about the shop mostly and the men who work there. The first one complained that the mechanics were a careless lot who never cared whether school kept or no and he said that he had had to fire some men for losing good customers. The second one said that the men in his shop were the best crowd of fellows he had ever known and they were white in skin and squareness all the way through. We think he knew what was the matter with the other man because he said, "Harry, when you learn to treat those boys the way they deserve, you'll find that they are not so bad after all. They're human and they want human treatment—give it to them and you'll find they'll make more friends for you than you'll have room for in your prospect file." And that's a fact. Those men ARE white and hinged on their department is the success or failure of the dealers' place. Do your stuff and do it right. If you would make friends of your customers, first make friends of your men.

—J. V. M.

Ty Cobb of the Detroit baseball outfit once started a tire shop in Georgia and it went bankrupt, all of which shows that the man who bats at .400 in baseball cannot clout at that average in the automotive business—it must be a case of where 1000 marks his sticking ability.

Squeeks & Rattles Editorial

From a correspondent in a distant city, comes a letter disputing the announcement contained on this page last week, wherein we told of the invention of a Deatur, Ill., gentleman, who had completed a tire rim which made it possible to change a tire while sitting in the front seat playing solitaire. This gent who signs himself I. M. Dumb, says that he was the inventor of this accessory and that it was not an invention—that it came about quite naturally one day while he and his wife were out motoring in their demonstrator.

He says they were going along at a gentle clip of about fifty per, when bang! went a tire. The rim disconnected itself from the wheel and went whizzing on ahead. In a second, the tire came off the rim and the jolt the machine received when the rim flew, caused the spare tire on the side to fall off in such a way as to roll on ahead. Suddenly, the tire overtook the rim and ran right onto it then, he said, the machine overtook the rim and strange as it may seem, that rim just fastened itself right onto the wheel again and our informant and his wife went right on ahead.

It is the purpose of this editorial to apologize to I. M. Dumb for the great injustice done him. Of course, he handles the truth rather carelessly but avers that the incident related above took place just a few miles from his home and has as proof, the road on which it happened and the car in which he was riding.

THE FATAL CROSSING

The fatal crossing! Grim death still functions there, with locomotives tossing their victims in the air. In vain the signboards glisten with warnings wide and high, for men won't look and listen, and consequently die. Each day we order caskets for people killed by trains; the coroners, with baskets, pick up the strewn remains. Along the highway's edges and from the stumps and stones, and from the trees and hedges they pick the collarbones. It ought to be a warning, and yet, alas, alack! The prudent signboards scorning, we cross the railway track; and now an engine busy comes whooping up the rails, and hits our priceless Lizzie, and through the air it sails. A spark plug and a piston is all that's left of Liz; we will not look or listen as merrily we whiz. The coroner is keeping his tab on our remains; our stricken aunts are weeping and cussing railway trains. Some gent will read these verses, I have no doubt, today, and thinking not of hearses, he'll scoot along his way; he'll strike a gait that's dizzy, that's neither safe nor sane, and presently his Lizzie will hit a railway train. We'll gather up the pieces and as we toll we'll wail, "The death list still increases; no warnings will avail!"

WALT MASON

'T WAS ALWAYS THIS WAY

Sweet young bride—"I had the car out this afternoon, but it jerked and wouldn't run worth a cent." He—"Did you have the carburetor adjusted the way I told you?" She—"Yes, but—" He—"But what?" She—"Oh, I remember now, I had no place to put my pocketbook so I hung it on the choker and that was why the mixture was so rich, wasn't it?"—L. W., Aurora, Ill.

The Service Men's Chorus

From early morn 'till late at night, we hear the owner moan,
Of squeaks and rattles in his car that lately there has grown
And, oh, the anguish in our hearts when in some guy will strut
And tell us of a scratch upon the spotlight's hidden nut.—T. C., Macon, Ga.

Notes from the Hub of the Industry

"How fortunate," remarks the Detroit Motor News, "how fortunate it is that motor cars do not use anthracite," and again, "If you think that the automobile has not about reached perfection, consider the fact that many of them now run much more quietly than some people eat soup."

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	
Acason.....	3-1	\$1650a	3 1/2 x 5	34x5n 34x5n	W	Commerce.....	18	2145	4 1/2 x 5 1/2	36x6n 40x8n	I	Garford.....	65-D	5	\$4500	5 x 6 1/2	36x6 40x6d	W
Acason.....RB	1 1/2	1950	3 1/2 x 5 1/2	36x3 1/2 36x6	W	Commerce.....	25	2425	4 1/2 x 5 1/2	36x4 36x7	W	Garford.....	150-A	7 1/2	5200	5 x 6 1/2	36x6 40x7d	C
Acason.....H	2 1/2	2750	4 1/2 x 5 1/2	36x4k 36x8k	W	Commerce.....	25	2770	4 1/2 x 5 1/2	36x6 40x8n	W	Gary.....	F-1	1 1/2	1775	3 1/2 x 5 1/2	36x3 1/2 36x5	W
Acason.....L	3 1/2	3450	4 1/2 x 5 1/2	36x5k 36x10k	W	Cook.....	51	3600	4 x 5 1/2	36x6n 40x8n	W	Gary.....	J	2	2450	4 x 5 1/2	36x3 1/2 36x6	W
Acason.....M	5	4350	5 x 6 1/2	36x6 40x12	W	Corbitt.....	E-22	1480	3 1/2 x 5	34x3 1/2 34x4	W	Gary.....	L	2 1/2	2850	1 1/2 x 5 1/2	36x4 36x8	W
Ace.....	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2 34x5k	W	Corbitt.....	D-22	2200	3 1/2 x 5	34x3 1/2 34x5	W	Gary.....	M	3 1/2	3790	4 1/2 x 6	36x5 40x5d	W
Ace.....A	2 1/2	2795	4 1/2 x 5 1/2	36x4k 36x7	W	Corbitt.....	C-22	2600	4 1/2 x 5 1/2	36x3 1/2 36x7	W	Gary.....	N	4 1/2	4450	5 x 6 1/2	36x6 40x6d	W
Acme.....	20	1	3 1/2 x 5	35x5n 35x5n	W	Corbitt.....	B-22	3000	4 1/2 x 5 1/2	36x4 36x7	W	Geraix.....	M	1 1/2	3100	4 x 5 1/2	36x3 1/2 36x7	W
Acme.....20	1 1/2	1	3 1/2 x 5	34x3 1/2 34x5	W	Corbitt.....	R-22	3200	4 1/2 x 5 1/2	36x4 36x8	W	Geraix.....	K	2 1/2	3500	4 1/2 x 5 1/2	36x4 36x8	W
Acme.....40	3	1	4 1/2 x 5	36x4 36x7	W	Corbitt.....	AA-22	3800	4 1/2 x 5 1/2	36x5 36x10	W	Geraix.....	K	3 1/2	4500	4 1/2 x 6	36x5 40x12	W
Acme.....60	3	1	4 1/2 x 5 1/2	36x4 36x7k	W	Corbitt.....	AA-22	4500	4 1/2 x 6	36x6 40x6d	W	Graham Bros.....	1	1	1265	3 1/2 x 5 1/2	33x4 1/2 34x5n	B
Acme.....90	4 1/2	1	4 1/2 x 5 1/2	36x5 40x10	W	Day-Elder.....	AS	1600	3 1/2 x 5	35x5n 35x5n	W	Graham Bros.....	1 1/2	1325	3 1/2 x 5 1/2	33x4 1/2 36x6n	B	
Acme.....125	6 1/2	1	4 1/2 x 6	36x6 40x12	W	Day-Elder.....	B	2000	3 1/2 x 5	34x3 1/2 34x5	W	Graham Bros.....	1 1/2	1245	3 1/2 x 5 1/2	33x4 1/2 36x5n	B	
American.....	25	3350	4 x 6	36x4k 36x4dk	W	Day-Elder.....	D	2400	4 1/2 x 5 1/2	36x4 36x7	W	Graham-Pion.....	10	1 1/2	1750a	3 1/2 x 5	36x3 1/2 36x5k	I
American.....40	4	4275	4 1/2 x 6	36x5k 36x5dk	W	Day-Elder.....	D	2750	4 1/2 x 5 1/2	36x4 36x7	W	Graham-Pion.....	15	1 1/2	2250a	3 1/2 x 5	36x3 1/2 36x5	W
American.....50	5	4500	4 1/2 x 6	36x5 36x12	W	Day-Elder.....	F	3150	4 1/2 x 5 1/2	36x5 36x7	W	Graham-Pion.....	20	2	2475a	4 1/2 x 5 1/2	36x4k 36x7k	W
Armleder.....	21	1145	3 1/2 x 5 1/2	34x3 1/2 34x6k	W	Day-Elder.....	C	3200	4 1/2 x 5 1/2	36x5 36x7	W	Graham-Pion.....	25	3	3300a	4 1/2 x 5 1/2	36x4k 36x7k	W
Armleder.....40-B	2 1/2	1145	3 1/2 x 5 1/2	34x3 1/2 34x6k	W	Day-Elder.....	E	3200	4 1/2 x 5 1/2	36x5 36x7	W	Graham-Pion.....	30	3 1/2	4225a	4 1/2 x 5 1/2	36x6n 42x9n	W
Armleder.....40-C	2 1/2	1145	3 1/2 x 5 1/2	34x3 1/2 34x6k	W	Day-Elder.....	F	3200	4 1/2 x 5 1/2	36x5 36x7	W	Graham-Pion.....	40	4 1/2	3850a	4 1/2 x 5 1/2	36x5 36x5dk	W
Armleder.....HW-C	2 1/2	1145	3 1/2 x 5 1/2	36x4k 36x7k	W	Day-Elder.....	FX	2300	3 1/2 x 5 1/2	34x4 34x5	W	Graham-Pion.....	50	5-6	4450a	4 1/2 x 6	36x6 40x6dk	W
Armleder.....KW-C	3 1/2	1145	3 1/2 x 5 1/2	36x4k 36x7k	W	Day-Elder.....	F	2180	3 1/2 x 5 1/2	34x4 34x5	W	Hall.....	1 1/2	3100	3 1/2 x 5	34x5n 38x7n	W	
Armleder.....KW-C	3 1/2	1145	3 1/2 x 5 1/2	36x5k 36x5dk	W	Day-Elder.....	48	2590	3 1/2 x 5 1/2	34x4 1/2 34x7	W	Hall.....	2 1/2	3275	4 1/2 x 5 1/2	36x4 36x6	W	
Atlas.....	22	1495	3 1/2 x 5 1/2	34x4 1/2 34x4 1/2	W	Defiance.....	G	1525a	3 1/2 x 5	35x5n 35x5n	B	Hall.....	3 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W	
Atlas.....44	1 1/2-2	1950	3 1/2 x 5 1/2	36x6n 36x6n	W	Defiance.....	E	2075a	3 1/2 x 5	35x5n 38x7n	I	Hall.....	5	5100	4 1/2 x 5 1/2	36x5 40x6d	W	
Atlas.....44	1 1/2-2	1950	3 1/2 x 5 1/2	36x6n 36x6n	W	Defiance.....	E	2075a	3 1/2 x 5	35x5n 38x7n	I	Hall.....	7	5100	4 1/2 x 5 1/2	36x5 40x6d	C	
Atterbury.....	20R	2475	3 1/2 x 5	34x3 1/2 34x5	W	Denby.....	31	1485	3 1/2 x 5	35x5n 35x5n	B	Hall.....	7 chain	7	5100	4 1/2 x 5 1/2	36x5 40x6d	C
Atterbury.....	22C	3375	4 1/2 x 5 1/2	36x4 36x4d	W	Denby.....	33	2145	4 1/2 x 5	35x5n 38x7n	I	Harvey.....	W OA	2	2650	1 1/2 x 5 1/2	34x4 34x7	W
Atterbury.....	22C	3375	4 1/2 x 5 1/2	36x4 36x4d	W	Denby.....	35	2705	4 1/2 x 5 1/2	36x4 36x7	I	Harvey.....	W FA	2 1/2	2950	1 1/2 x 5 1/2	36x4 36x7	W
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Denby.....	27	3895	4 1/2 x 5 1/2	36x5 36x5d	I	Harvey.....	W HA	3 1/2	3950	1 1/2 x 5 1/2	36x5 36x5d	W
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Denby.....	210	4295	4 1/2 x 5 1/2	36x6 40x6d	I	Hawkeye.....	O	1	1375	3 1/2 x 5 1/2	34x5n 34x5n	I
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Dependable.....	A	1650	3 1/2 x 5	34x5n 36x4n	W	Hawkeye.....	N	1 1/2	1645	3 1/2 x 5 1/2	34x3 1/2 34x5k	I
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Dependable.....	C	2350	3 1/2 x 5	34x3 1/2 34x5	W	Hawkeye.....	M	2	2145	1 1/2 x 5	36x4k 36x6k	I
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Dependable.....	D	2650	4 x 5 1/2	36x5 36x6	W	Hawkeye.....	N	3 1/2	3700	4 1/2 x 5 1/2	36x5k 36x10k	I
Atterbury.....	22D	4275	4 1/2 x 5 1/2	36x5 40x5d	W	Dependable.....	E	2950	4 1/2 x 5 1/2	36x4 36x7	W	Hendrickson.....	O	1 1/2	2200	3 1/2 x 5 1/2	36x4n 36x5n	W
Autocar.....	21UF	1950	4 1/2 x 5 1/2	34x4k 34x5k	D	Diamond T.....	O-3	1975	3 1/2 x 5 1/2	36x3 1/2 36x4n	W	Hendrickson.....	N	2 1/2	2600	1 1/2 x 5 1/2	36x4k 36x7k	W
Autocar.....	21UG	2050	4 1/2 x 5 1/2	34x4k 34x5k	D	Diamond T.....	T	2250	3 1/2 x 5 1/2	36x3 1/2 36x5	W	Hendrickson.....	M	3 1/2	3000	1 1/2 x 5 1/2	36x5k 36x5dk	W
Autocar.....	27H	2950	4 x 5 1/2	34x5 36x7	D	Diamond T.....	U	2650	4 x 5 1/2	36x4 36x7	W	Hendrickson.....	K	5	4000	5 x 6 1/2	36x6 40x6	W
Autocar.....	27K2	3075	4 x 5 1/2	34x5 36x7k	D	Diamond T.....	U	3750	4 x 5 1/2	36x4 36x7	W	Huffman.....	B	1 1/2	1795	3 1/2 x 5	34x3 1/2 34x6	W
Autocar.....	26Y	3950	4 1/2 x 5 1/2	34x6 36x12	D	Diamond T.....	K	4325	4 1/2 x 5 1/2	36x6 40x6d	W	Huffman.....	D	1 1/2	1605	3 1/2 x 5	36x3 1/2 36x6	I
Autocar.....	26B	4100	4 1/2 x 5 1/2	34x6 36x12	D	Diamond T.....	EL	4325	4 1/2 x 5 1/2	36x6 40x6d	W	Huffman.....	D	2-3	2805	4 1/2 x 5 1/2	36x4 36x7	W
Available.....	H1 1/2	2475	4 x 5	36x3 1/2 36x5k	W	Doane.....	5	1100b	4 1/2 x 5 1/2	36x5 36x7	C	Hurlburt.....	A-A	1-1 1/2	1950	3 1/2 x 5	34x5n 34x5n	W
Available.....	H2	2775	4 x 5	36x3 1/2 36x6k	W	Doane.....	6	5100b	4 1/2 x 5 1/2	36x5 36x5d	C	Hurlburt.....	B-C	2-2 1/2	2800	4 1/2 x 5 1/2	36x4 36x4d	W
Available.....	H2 1/2	3160	4 x 5	36x4k 36x8k	W	Doane.....	6	6000b	5 x 6 1/2	36x6 40x6d	C	Hurlburt.....	C-C	3 1/2	3475	4 1/2 x 5 1/2	36x4 36x5d	W
Available.....	H3 1/2	4175	4 1/2 x 5 1/2	36x5 40x5d	W	Dodge Brothers.....	1	730	3 1/2 x 4 1/2	32x4n 32x4n	B	Hurlburt.....	D-D	4-4 1/2	4150	4 1/2 x 6	36x5 36x6d	W
Available.....	H5	5375	5 x 6	36x6 40x12	W	Dorris.....	K-2	2490	4 x 5 1/2	36x5n 33x5n	B	Hurlburt.....	E-E	6-6 1/2	4850	4 1/2 x 6 1/2	36x6 40x6d	W
*Avery.....	1	3	3 x 4 1/2	34x5n 34x5n	I	Dorris.....	K-4	3400	4 1/2 x 5 1/2	36x4 36x7	W	Indep't (Iowa) B	1	1665	3 1/2 x 5	34x3 1/2 34x4	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) G	1 1/2	2040	3 1/2 x 5 1/2	34x3 1/2 34x5	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4 36x7	I	
						Dorris.....	K-7	4400	4 1/2 x 5 1/2	36x5 36x10	W	Indep't (Iowa) HI	2 1/2	2940</				

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Kleiber.....BB	2	\$3600	1 1/2 x 5 1/2	36x1 1/2 36x7 1/2	W	Old Hickory.....W	1	\$1775	3 1/2 x 5	36x3 1/2 36x4 1/2	W	Service.....21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Kleiber.....B	2 1/2	3950	1 1/2 x 5 1/2	36x5 1/2 36x8	W	Old Reliable.....A	1 1/2	2350	4 x 5	31x4 36x6	W	Service.....32	2	.....	4 x 5 1/2	36x3 1/2 36x7	W
Kleiber.....C	3	4600	1 1/2 x 5 1/2	36x5 1/2 36x5 1/2	W	Old Reliable.....B	2 1/2	3500	4 1/2 x 6	31x4 36x4 1/2	W	Service.....37	2	.....	4 1/2 x 5 1/2	35x5 1/2 38x7 1/2	W
Kleiber.....D	5	5300	5 x 6 1/2	36x6 40x12	W	Old Reliable.....C	3 1/2	4250	4 1/2 x 6	36x5 36x5 1/2	W	Service.....52	3	.....	4 1/2 x 5 1/2	36x1 36x8	W
Koehler.....D	1 1/2	2150	3 1/2 x 5	31x3 1/2 31x5	W	Old Reliable.....D	5	5000	4 1/2 x 6	36x6 40x6 1/2	W	Service.....72	3 1/2	.....	1 1/2 x 5 1/2	36x5 36x5 1/2	W
Koehler.....M	2 1/2	3175	1 1/2 x 5 1/2	36x4 36x7	W	Old Reliable KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7 1/2	C	Service.....77	4	.....	1 1/2 x 6	36x5 36x5 1/2	W
Koehler.....MCS	2 1/2	3275	1 1/2 x 5 1/2	36x4 36x7	W	Olympic.....A	2 1/2	1095	3 1/2 x 5 1/2	35x5 35x5 1/2	W	Service.....102	6	.....	1 1/2 x 6	36x6 40x6 1/2	W
Koehler.....F	3 1/2	4170	1 1/2 x 5 1/2	36x5 36x10	W	Olympic.....B	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x8	W	Signal.....NF	1	\$1450	3 1/2 x 5	34x5 1/2 36x6 1/2	W
Koehler.MT.Trac	3 1/2	3275	1 1/2 x 5 1/2	36x4 36x7	W	Olympic.....C	2 1/2	2825	4 1/2 x 5 1/2	36x3 1/2 36x7	W	Signal.....H	1 1/2	1950	4 1/2 x 5 1/2	34x4 36x6	W
Krebs.....23	3 1/2	1200	3 1/2 x 5	31x3 1/2 31x4 1/2	B	Olympic.....D	2 1/2	3700	4 1/2 x 5 1/2	36x4 36x8	W	Signal.....J	2 1/2	2375	4 1/2 x 5 1/2	34x4 36x8	W
Krebs.....24	1 1/2	1535	3 1/2 x 5	31x5 31x5	W	Olympic.....E	5	4050	4 1/2 x 5 1/2	36x5 36x10	W	Signal.....M	3 1/2	3175	4 1/2 x 5 1/2	36x5 40x5 1/2	W
Krebs.....45	1 1/2	2125	4 1/2 x 5 1/2	36x4 36x7	W	Olympic.....F	5	4725	4 1/2 x 5 1/2	36x6 40x12	B	Signal.....R	5	3900	4 1/2 x 6	36x6 40x6 1/2	W
Krebs.....75	2 1/2	2375	4 1/2 x 5 1/2	36x4 36x8	W	Oshkosh.....A	2	2185	3 1/2 x 5	36x6 36x6 1/2	B	Standard.....75	1 1/2	1330	3 1/2 x 5	33x5 1/2 33x5 1/2	W
Krebs.....119	3 1/2	2975	4 1/2 x 5 1/2	36x5 40x10	W	Oshkosh.....AA	2	2585	3 1/2 x 5	36x6 36x6 1/2	B	Standard.....1-K	1 1/2	1600	3 1/2 x 5	33x3 1/2 34x5k	W
Larrabee.....X-2	1	1925	3 1/2 x 4 1/2	31x5 31x5	B	Oshkosh.....B	2 1/2	3485	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Standard.....76	2 1/2	2400	4 1/2 x 5 1/2	36x5 36x5 1/2	W
Larrabee.....J	1 1/2	2100	3 1/2 x 5	31x3 1/2 31x5	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Standard.....66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x10	W
Larrabee.....J	2 1/2	2400	3 1/2 x 5	31x3 1/2 31x5	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Standard.....5-K	5-7	4400	4 1/2 x 6	36x6 40x12	W
Larrabee.....K	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x7	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Star.....1 1/2	1 1/2	6105	3 1/2 x 4 1/2	36x3 1/2 36x3 1/2	B
Larrabee.....K	2 1/2	3150	4 1/2 x 5 1/2	36x4 36x7	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Sterling.....1 1/2	1 1/2	2835	1 1/2 x 5 1/2	36x3 1/2 36x3 1/2	W
Larrabee.....L	2 1/2	4000	4 1/2 x 5 1/2	36x5 36x5 1/2	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Sterling.....2	2	3085	1 1/2 x 5 1/2	36x4k 36x6k	W
Larrabee.....W	5-7	4390	4 1/2 x 6	36x6 40x6 1/2	W	Oshkosh.....BB	2 1/2	2585	1 1/2 x 5 1/2	38x7 1/2 38x7 1/2	B	Sterling.....2 1/2	2 1/2	3290	1 1/2 x 5 1/2	36x4k 36x6k	W
Maccar.....L	1 1/2	.....	1 1/2 x 5 1/2	36x1 36x6	W	Packard.....EC	2-3	3100	1 1/2 x 5 1/2	36x4 36x7	W	Sterling.....3	3 1/2	4325	1 1/2 x 6 1/2	36x5k 40x5 1/2	W
Maccar.....H-A	2	.....	1 1/2 x 5 1/2	36x4 36x4 1/2	W	Packard.....ED	2-3	3100	1 1/2 x 5 1/2	36x4 36x7	W	Sterling.....3 1/2	3 1/2	4325	1 1/2 x 6 1/2	36x5k 40x5 1/2	W
Maccar.....H-2	3	.....	1 1/2 x 5 1/2	36x4 36x4 1/2	W	Packard.....ED	2-3	3100	1 1/2 x 5 1/2	36x4 36x7	W	Sterling.....5-W	5	4950	5 x 6 1/2	36x6 40x6 1/2	W
Maccar.....M-3	4	.....	1 1/2 x 5 1/2	36x5 36x6 1/2	W	Packard.....EF	5-7 1/2	4500	5 x 6 1/2	36x6 40x6 1/2	W	Sterling.....5-C	5	5500	5 x 6 1/2	36x6 40x6 1/2	C
Maccar.....G	5-6	.....	1 1/2 x 5 1/2	36x5 36x6 1/2	W	Packard.....EF	5-7 1/2	4500	5 x 6 1/2	36x6 40x6 1/2	W	Sterling.....7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x6 1/2	C
MacDonald.....A	7 1/2	5750	1 1/2 x 5 1/2	36x7 40x14	W	Paige.....52-19	1 1/2	1950	4 x 5 1/2	31x3 1/2 31x5	W	Stewart.....Utility	1 1/2-1 1/2	1245	3 1/2 x 5 1/2	34x4 1/2 34x5 1/2	I
Mack.....AB D.R.	1 1/2	3150	1 1/2 x 5	36x4 36x3 1/2	D	Paige.....51-20	2 1/2	2120	4 1/2 x 5 1/2	31x4 31x8	W	Stewart.....15	1 1/2-1 1/2	1445	3 1/2 x 5 1/2	35x5 35x5 1/2	I
Mack.....AB Chain	1 1/2	3300	1 1/2 x 5	36x4 36x3 1/2	D	Paige.....51-19	3 1/2	3145	4 1/2 x 5 1/2	31x4 31x8	W	Stewart.....9	1 1/2-2 1/2	1700	3 1/2 x 5 1/2	34x4 34x6	I
Mack.....AB Chain	1 1/2	3300	1 1/2 x 5	36x4 36x3 1/2	D	Parker.....C-22	2 1/2	1875	3 1/2 x 5 1/2	31x4 31x8	W	Stewart.....7	2-2 1/2	2190	4 1/2 x 5 1/2	34x4 34x6	I
Mack.....AB D.R.	2 1/2	3750	4 x 5	36x4 36x4 1/2	D	Parker.....G-22	2 1/2	3200	4 1/2 x 6	31x4 36x4 1/2	W	Stewart.....7-X	2 1/2-3	2300	4 1/2 x 5 1/2	34x4 34x8	I
Mack.....AB D.R.	2 1/2	3850	4 x 5	36x4 36x4 1/2	D	Parker.....J-20	3 1/2	3950	4 1/2 x 6	36x5 40x5 1/2	W	Stewart.....10	10 3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AB Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6 1/2	W	Stewart.....10-X	3 1/2-4	3190	4 1/2 x 5 1/2	36x5 36x5 1/2	I
Mack.....AC Chain	3 1/2	4100	1 1/2 x 5	36x4 36x4 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6							

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Vim.....30	1 1/2	\$1175	3 1/2 x 4 1/2	32x4 1/2 32x4 1/2	W	White.....20	2	\$3250	3 1/2 x 5 1/2	30x4k 30x7k	D	Wichita.....O	4	\$3500	4 1/2 x 6 1/2	30x5k 30x5k	W
*Vim.....50	1 1/2	995	4 x 5	32x4n 32x4n	B	White.....40	3 1/2	4200	3 1/2 x 5 1/2	30x5 40x5d	D	Wilcox.....AA	1	1900	3 1/2 x 5 1/2	30x4k 30x4k	W
Vim.....31	1	1975	3 1/2 x 5 1/2	35x5n 35x5n	W	White.....45	5	4500	1 1/2 x 5 1/2	30x6 40x6d	D	Wilcox.....BB	1 1/2	2550	1 1/2 x 5	30x4 30x5	W
Vim.....22	2	3150	3 1/2 x 5 1/2	30x4 30x6	W	White Hick.....E	1	1225	3 1/2 x 5	34x5n 34x5n	W	Wilcox.....D	2 1/2	3000	1 1/2 x 5	30x4k 30x3 1/2 k	W
Vim.....23	3	3950	1 1/2 x 5 1/2	30x5 36x5 1/2	W	White Hick.....H	1 1/2	1375	3 1/2 x 5	30x3 1/2 30x5	W	Wilcox.....E	3 1/2	3950	1 1/2 x 5	30x5k 30x5k	W
Walker-Johnson A	2	2500	3 1/2 x 5	34x3 1/2 34x6	W	White Hick.....K	2 1/2	1675	1 1/2 x 5 1/2	30x4 30x5	W	Wilcox.....F	5	4350	1 1/2 x 6 1/2	30x5 40x6d	W
Walker-Johnson B	3	3000	1 1/2 x 5 1/2	30x4 30x8	W	Wichita.....K	2	1875	3 1/2 x 5 1/2	30x3 1/2 30x4k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5	30x3 1/2 30x5	W
Walter.....M	2 1/2	3850	4 1/2 x 5 1/2	30x4 30x8	D	Wichita.....M	1	2400	3 1/2 x 5 1/2	30x3 1/2 30x6k	W	Wilson.....EA	2 1/2	2825	1 1/2 x 5 1/2	30x4 30x7	W
Walter.....S	5	4850	1 1/2 x 6 1/2	30x6 40x6 1/2	W	Wichita.....RX	3	3200	1 1/2 x 5 1/2	30x4k 30x5k	W	Wilson.....G	3 1/2	3685	1 1/2 x 5 1/2	30x5 30x5	W
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5n 35x5n	W							Wilson.....H	5	4520	4 1/2 x 6	30x6 40x6	W
Watson.....N	3 1/2	4250	1 1/2 x 5 1/2	30x5 36x10	W							*Wisconsin.....A	1	1750	3 1/2 x 5	34x5n 34x5n	W
Western.....W1	1 1/2	2550	4 1/2 x 5 1/2	30x3 1/2 36x5k	W							Wisconsin.....B	1	2100	3 1/2 x 5	35x5 36x6	W
Western.....L1	1 1/2	2550	3 1/2 x 5	30x3 1/2 36x5k	W							Wisconsin.....C	2 1/2	2700	1 x 5 1/2	36x6n 36x7	W
Western.....W2	1 1/2	3250	4 1/2 x 5 1/2	30x4 36x7	W							Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	36x6n 40x8	W
Western.....L2	1 1/2	3250	4 1/2 x 5	30x4 36x7	W							Wisconsin.....E	5	3500	4 1/2 x 5 1/2	36x6 36x10	W
Western.....W3	3 1/2	4250	4 1/2 x 6	30x5 40x5 1/2	W							Wisconsin.....F	7	4000	5 x 6 1/2	36x6 36x12	W
*White.....15	1 1/2	2400	3 1/2 x 5 1/2	34x5n 34x5n	B							Witt-Will.....N	11	2450	3 1/2 x 5	36x3 1/2 36x6k	W
												Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	30x4k 30x8k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl.
d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Allis-Chal. G.P	6-12	\$250	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Fordson.....	18-25	\$395	4	Own	4-4x5	G.K	2	*Oldsmar . . K	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Allis-Chalm. .	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Frick.....A	12-20	....	4	Br.L.	4-4 x 6	G,K	2-3	Pioneer.....G	18-36	1750	4	Own	4-5 1/2 x 6	G,K,D	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Allis-Chalm. .	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Frick.....C	15-28	....	4	Beav.	4-4 1/2 x 6	G,K	3-4	Pioneer.....C	40-75	3550	4	Own	4-7 x 8	G,K	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Alkwork.....2-G	14-28	1595	4	Own	4-4 1/2 x 6	GorK	3									Plowman.....A	15-30	1295	4	Buda	4-4 1/2 x 6	G,K	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
*ARO 1921-22	3-6	385	4	Own	1-4 1/2 x 5	Gas.	1	Grain Belt.....A	18-36	2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Reliable.....	10-20	300	4	Own	2-6 x 7	Ker.	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Aultman-T.....	15-30	1900	4	Clim.	4-5 x 6 1/2	G,K	4	Gray.....	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Russell.....	12-21	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Aultman-T.....	22-45	2800	4	Own	4-5 1/2 x 8	G,K	6	Gray.....	22-44	2165	3	Wauk.	4-5 x 6 1/2	Gas.	4-5	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Aultman-T.....	30-60	4000	4	Own	4-7 x 9	G,K,D	8-10	Gt. Western St.	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Automot. B-3	12-21	1250	4	Here.	4-4 x 5 1/2	Gas.	2-3									Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Avery, S.R. Cal.	5-10	....	4	Own	4-3 x 4	G,K	....	Hart-Parr. 20	20	845	4	Own	2-5 1/2 x 6 1/2	K,D.	2	Samson.....M	10-20	445	4	Own	4-4 x 5 1/2	G,K	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Avery, Cult-C.	5-10	....	3	Own	6-3 x 4	G,K	....	Hart-Parr. 30	30	1065	4	Own	2-6 1/2 x 7	K,D.	3	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Avery.....B	5-10	....	4	Own	4-3 x 4	G,K	2	Hart-Parr.....	....	1695	4	Own	2-6 1/2 x 7	K,D.	3	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Avery.....C	5-10	....	4	Own	4-3 x 4	G,K	2	Heider.....D	9-16	870	4	Wauk.	4-4 1/2 x 6 1/2	G,K	2	*Shelby.....	1	150	3	B & S	1-2 1/2 x 2 1/2	G	....																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Avery.....	8-16	....	4	Own	2-5 1/2 x 6	G,K,D	2-3	Heider.....C	12-20	628	4	Wauk.	4-4 1/2 x 6 1/2	G,K	3	Shelby.....D	15-30	....	4	Beav.	4-4 1/2 x 6	G,K	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Avery.....	12-20	....	4	Own	4-4 1/2 x 6	G,K,D	3-4	Huber Light 4	12-25	985	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3	Shelby.....C	0-18	....	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Avery.....	12-25	....	4	Own	2-6 1/2 x 7	G,K,D	3-4	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Avery.....	14-28	....	4	Own	4-4 1/2 x 6	G,K,D	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Avery.....	18-36	....	4	Own	4-5 1/2 x 8	G,K,D	4-5	Indiana.....F	5-10	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Toro Cultivator	6	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Avery.....	25-50	....	4	Own	4-6 1/2 x 7	G,K,D	5-6	International	8-16	1670	4	Own	4-4 1/2 x 5	G,K,D	2	Toro Tractor 22	0-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Avery.....	45-65	....	4	Own	4-7 1/2 x 8	G,K,D	8-10	Internat. Titan	10-20	1700	4	Own	2-6 1/2 x 8	G,K,D	3	Townsend.....	10-20	800	2	Own	4-0 1/2 x 7	Ker.	2-3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
								International	15-30	1750	4	Own	4-5 1/2 x 8	G,K,D	4	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Bates Mule. H	15-25	....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	*Kinkade.....	1 1/2	190	1	Own	1-3 x 3	Gas.	....	Townsend.....	25-50	2500	2	Own	4-8 1/2 x 10	Ker.	4-8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Bates Mule. F	18-25	....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3									Traction Motor	40-50	....	4	LeR.	8-3 1/2 x 5	Gas.	4-5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Bates Mule G	25-35	....	4	Midw.	4-4 1/2 x 6	Gas.	4	La Crosse.....	12-24	985	2	Own	2-6 x 7	G,K	3	Traylor.....TB	6-12	500	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Beav.....	25-35	4250	4	Ste.	4-4 1/2 x 6 1/2	Gas.	4	Lauson.....5	12-25	1275	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Trumdar.....10	25-40	3750	2	Wauk.	4-5 x 6 1/2	G or K	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
*Boeman.....G	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	....	Lauson.....21	15-30	1675	4	Beav.	4-4 1/2 x 5 1/2	G or K	3-4	Twin City.....	12-20	1200	4	Own	4-4 1/2 x 6	G,K	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Best.....	30	....	4	Own	4-4 1/2 x 6 1/2	G,K,D	4	Lauson Road	15-30	2000	4	Beav.	4-4 1/2 x 6	K	....	Twin City.....	20-35	2750	4	Own	4-5 1/2 x 6 1/2	G,K	5-6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Best.....	60	....	4	Own	4-6 1/2 x 8 1/2	G,K,D	8-9	Leader.....B	12-18	685	4	Own	2-6 x 6 1/2	G,K,D	2-3	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 9	G,K	8-10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
*Bolens.....	5-10	395	4	B & S.	1-2 1/2 x 2 1/2	G.	....	Leader.....N	16-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Uncle Sam C20	12-20	1 1/2	4	Weid.	4-4 x 5 1/2	G	2-3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Boring.....	5-10	395	4	LeR.	4-3 1/2 x 4 1/2	G	....	Leader.....GU	18-35	2150	2	Clim.	4-5 x 6 1/2	G,K	3-4	Uncle Sam B19	20-30	1085	4	Beav.	4-4 1/2 x 6	G or K	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Boring.....1921	1850	....	3	Wauk.	4-4 1/2 x 5 1/2	GorK	2	Linn.....H4	60	5000	*	Cont.	4-4 1/2 x 6 1/2	Gas	4	Uncle Sam D21	20-30	1895	4	Beav.	4-4 1/2 x 6	G or K	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
*Bryan.....	15-30	....	4	Own	2-4 x 5	K.	3	Linn.....W	16-22	2200	2	Own	4-5 x 6 1/2	K	4	Utilitor.....501	2 1/2-4	295	4	Own	1-3 1/2 x 4 1/2	G	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
								Little Giant, B	16-22	2200	2	Own	4-5 x 6 1/2	K	4	Utilitor.....501A	2 1/2-4	340	4	Own	1-3 1/2 x 4 1/2	G	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Capital.....	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	Little Giant, A	28-35	3300	4	Own	1-5 1/2 x 6	K	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Case.....	12-20	1050	4	Own	4-4 1/2 x 5	G,K,D	3	Lombard 1922	35-150	8950	2	Wise.	0-5 1/2 x 6 1/2	Gas.	16	Wallis.....K	15-25	....	4	Own	4-4 1/2 x 5 1/2	G,K	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Case.....	12-20	....	4	Own	4-4 1/2 x 5	G,K,D	2	Lombard 1922	50	5300	2	Wise.	4-4 1/2 x 6 1/2	Gas.	6-10	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	Ker.	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Case.....	15-27	1320	4	Own	4-4 1/2 x 6	G,K,D	3-4									Wetmore 21-22	12-25	1185	4	Wauk.	4-4 x 5 1/2	G,K	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Case.....	22-40	2550	4	Own	4-5 1/2 x 6 1/2	G,K,D	4-5	MerryGar 1922	2	210	2	Evin	1-2 1/2 x 2 1/2	Gas.	....	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	G,K.D	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Case.....	40-72	5200	4	Own	7 x 8	G,K,D	8-10	Minne.....All-P	12-25	800	4	Own	4-4 1/2 x 7	G or K	3	Wichita.....T	15-30	2000	4	Beav.	4-4 1/2 x 6	G,K,D	3-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Caterpillar T35	15	....	2	Own	4-4 1/2 x 5 1/2	Gas.	3	Minne.....Gen-P	17-30	1600	4	Own	4-4 1/2 x 7	G or K	3-4	Wisconsin.....E	16-30	1850	4	Clim.	4-5 x 6 1/2	G or K	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Caterpillar 5T	25	....	2	Own	4-4 1/2 x 6	Gas.	4	Minne.....Med-D	22-44	2650	4	Own	4-7 1/2 x 9	G or K	5-6	Wisconsin.....F	20-40	2050	4	Wauk.	4-5 x 6 1/2	G or K	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Caterpillar 10T	40	....	2	Own	4-6 1/2 x 8 1/2	G,K,D	8-9	MinneHeavyD	35-70	3850	4	Own	4-7 1/2 x 9	G or K	8-9	Wisconsin.....H	22-40	2550	4	Clim.	4-5 1/2 x 7	G or K	4-6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Centaur.....	6-2 1/2	345	2	N Way	2-2 1/2 x 3 1/2	GorK	1	Mohawk 1922	8-16	650	2	Light	4-3 1/2 x 5 1/2	K or G	2-3	Yuba.....12-20	12-20	2400	2	Wisc.	4-4 1/2 x 6 1/2	G,K,D	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Cietrac.....F	9-16	895	2	Own	4-3 1/2 x 4 1/2	G,K,D	2	Moline Orch.	9-18	650	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....15-25	15-25	2750	2	Wisc.	4-4 1/2 x 6	G,K,D	..																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Cietrac.....W	12-20	1345	2	Own	4-4 x 5 1/2	G,K,D	2-3	Moline Univ.	20-30	3500	2	Beav.	4-4 1/2 x 6	G,K,D	4	Yuba.....20-35	20-35	3900	2	Wisc.	4-5 1/2 x 7	G,K,D	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
								*Monarch.....	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	..	Yuba.....25-40	25-40	4250	2	Wisc.	4-5 1/2 x 7	G,K,D	..																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
								Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	..	*Yuba.....	25-40	4750	2	Wisc.	4-5 1/2 x 7	D	..																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Dakota.....4	15-27	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	NB.....1	3-6	375	4	Own	2-3 1/2 x 4	Gas.	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Dill.....D	20	2380	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	Nichols-Shep.	20-42	2650	4	Own	8 x 10	G or K	3-6	ABBREVIATIONS:	G—Gasoline. K—Kerosene. D—Distillate. Flow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Here.—Hercules. Lett.—Lefroy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. ‡Track Runner. †Industrial Tractor. ‡Garden Tractor. *Steam Tractor																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								



CADILLAC

The year 1922 is the most brilliantly successful that the Cadillac Dealer Organization has ever enjoyed, and has resulted in the manifest and material strengthening of Cadillac leadership in the fine car field.

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

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Standard of the World

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador..... R Cont.	6-3 1/2 x 5 1/4	136	33x5	b1885	b4500	\$4500	....	\$6500		Lincoln..... Own.	8-3 1/2 x 5	136	33x5	\$3800	b3800	\$3800	\$4400	\$4700	
American..... D-66 H-S.	6-3 1/2 x 5	127	33x4 1/2	b1885	b1850n	1850	....	2485		Locomobile..... 48 Own.	6-4 1/2 x 5 1/2	142	35x5	....	b7600	7600	10500	11000	
Anderson..... Aluminum 6 Cont.	6-3 1/2 x 4 1/4	114	32x4	....	1195	....	....	....		Marmont..... 34 Own.	6-3 1/2 x 5 1/4	136	32x4 1/2	3385	b3185	3185	3985	4385	
Anderson..... Series 40 Cont.	6-3 1/2 x 4 1/2	120	33x4	1495	1495	1595	\$1995	1995		Maxwell..... Own.	4-3 1/2 x 4 1/2	109	31x4	885	885	....	1235	1335	
Apperson..... 8-21-S Own.	8-3 1/2 x 5	130	31x4 1/2	....	2620	2645	3625	3695		McFarlan..... 1922 Own.	6-4 1/2 x 6	140	33x5	6300	b6300	6300	7500	7500	
Auburn..... 6-51 Cont.	6-3 1/2 x 4 1/2	121	32x4	1575	1475	....	2275	2345		Mercer..... Own.	6-3 1/2 x 5	132	32x4 1/2	3730	3750	....	5000	5000	
Auburn..... 6-51 Cont.	6-3 1/2 x 4 1/2	121	32x4 1/2	....	n1995	1545	....	....		Mercer..... Series 5 Own.	4-3 1/2 x 6 1/2	132	32x4 1/2	3950	b3950	c3950	4850	5250	
Barley..... Cont.	6-3 1/2 x 1 1/4	118	32x4	....	1395	....	....	1850		Merit..... Cont.	6-3 1/2 x 4 1/2	119	32x4	1895	....	....	....	....
Bay State..... Cont.	6-3 1/2 x 1 1/2	121	32x4	....	1900	....	2100	2500		Mitchell..... F-50 Own.	6-3 1/2 x 5	120	32x4	1490	1590	b1850	b2050	2275	
Biddle..... B1 & B5 Cont.	4-3 1/2 x 5 1/2	121	32x4	2453	b2950	....	3350	3950		Mitchell..... F-50 Own.	6-3 1/2 x 5	127	32x4 1/2	....	....	1900	....	....
Brewster..... 91 Cont.	4-4 x 5 1/2	123	32x4 1/2	....	5000	5000	....	7000		Monroe..... 1922-S-9 Own.	4-3 1/2 x 4 1/2	115	32x3 1/2	950	950	....	....	....
Buick..... 1923-34-5-6-7-38 Own.	4-3 1/2 x 4 1/4	139	31x4	865	885	u 725	1175	1395	1325e	Moore..... 6-40 Cont.	6-3 1/2 x 1 1/4	115	31x4	1795	1795	....	1695	....
Buick..... 1923-41-4-5-47 Own.	6-3 1/2 x 4 1/2	113	33x4 1/2	1175	1195	u1075	1935	1985	....	Moore..... 6-58 Cont.	6-3 1/2 x 4 1/2	128	33x4 1/2	1785	1785	....	2785	....
Buick..... 1923-48-9-50-4-55 Own.	6-3 1/2 x 4 1/2	124	31x4 1/2	n1625v	n1675v	u135	1395	2195	....	Nash..... 691-96-97 Own.	6-3 1/2 x 5	121	33x4	1210	1240	b1395n	....	2040	....
Cadillac..... 61 Own.	8-3 1/2 x 5 1/2	132	33x5	3100	3150	3150	b3975	4100	....	Nash..... 692-94-95 Own.	6-3 1/2 x 5	127	34x4 1/2	....	1390	b1890	2190	....
Case..... X Cont.	6-3 1/2 x 4 1/2	122	32x4 1/2	1750	1790	....	2551	2690	....	Nash Four..... 41-4 Own.	4-3 1/2 x 5	112	33x4	915	935	....	1195k	1275k	
Case..... W Cont.	6-3 1/2 x 5 1/4	129	31x4 1/2	....	2200	2250	2350	3250	....	National..... BB Own.	6-3 1/2 x 5 1/4	130	32x4 1/2	a2475	b2475	2375	b3725	3825	
Chalmers..... 1922 Own.	6-3 1/2 x 1 1/2	117	32x4	1185	1185	....	1535	2295	....	Noma..... 3C Cont.	6-3 1/2 x 4 1/2	128	32x4 1/2	2500	b2500	c2600	....	3500	....
Chalmers..... 1922 Own.	6-3 1/2 x 1 1/2	122	32x4	....	1315	....	....	....	....	Noma..... 1D Ben.	6-3 1/2 x 5 1/4	128	32x4 1/2	3000	b3100	c3200	....	5500	....
Chandler..... Six Cont.	6-3 1/2 x 5	123	33x4	1495n	b1495	1615	b1995	2295	2395	Normark..... 430-KS Lye.	4-3 1/2 x 5	116	32x3 1/2	....	1035	....	....	....
Chevrolet..... Superior Own.	4-3 1/2 x 4	132	30x3 1/2	510	525	u425	b840	860	....	Oakland..... 6-44 Own.	6-2 1/2 x 4 1/4	115	32x4	975	995	b1165n	b1445	1545	
Chevrolet..... FB Own.	4-3 1/2 x 5 1/4	110	33x4	865	885	....	1325	1395	....	Ogren..... 6 T D Luxe Cont.	6-3 1/2 x 5 1/4	134	33x5	b3750	3750	3850	4500	4800	
Cleveland..... 41 Own.	6-3 1/2 x 4 1/2	112	32x4	1035	1095	n1260	1495	1585	....	Oldsmobile..... 43 A Own.	4-3 1/2 x 5 1/4	115	32x4	955	....	1350	1475	1595	
Cole..... 800 Cont.	8-3 1/2 x 4 1/2	127 1/4	33x5	2685	b2685n	2685	b3385	3685	....	Oldsmobile..... 46 Own.	8-2 1/2 x 4 1/4	122	33x4 1/2	b1735	c1550	1735	2635	....
Columbia..... Elite Cont.	6-3 1/2 x 1 1/2	115	32x4	1175	1175	b1475n	b1925	1995	....	Oldsmobile..... 47 Own.	8-2 1/2 x 4 1/2	115	32x4	1675	1375	b1675n	1875	2025	
Columbia..... Light Six Cont.	6-3 1/2 x 1 1/4	115	31x4	935	935	....	....	1395	....	Overland..... 4 Own.	4-3 1/2 x 4	100	30x3 1/2	525	525	425u	795	875	
Comet..... C-53 Cont.	6-3 1/2 x 5 1/4	125	33x4 1/2	....	1185	2085	....	2985	....	Packard..... Single-Six Own.	6-3 1/2 x 5	126	33x4 1/2	2485	2485	u2250	3175	3275	
Courier..... Cont.	6-3 1/2 x 4 1/2	110	32x4	11395	1395	b1495n	2065	2165	....	Packard..... Single-Six Own.	6-3 1/2 x 5	133	33x4 1/2	....	u2350	2685	....	3525	....
Crawford..... 22-6-53 Cont.	6-3 1/2 x 5 1/4	122 1/2	32x4	3393	3993	3000	....	4500	....	Packard..... Twin-Six Own.	12-3 x 5	136	35x5	3850	3850	5240	5400	....
Crawford-Dagner..... 6-6 Cont.	6-3 1/2 x 5 1/4	135	33x5	....	n3530	....	....	....	....	Paige..... 6-44 Own.	6-3 1/2 x 5	119	32x4	1465	1465	u1290	1995	2245	
Daniels..... D-1 Own.	8-3 1/2 x 5 1/2	132	33x5	1353	b1353	4350	5250	6000	....	Paige..... 6-66 Cont.	6-3 1/2 x 5	131	33x4 1/2	a2495	u2245	2195	3100	3155	
Davis..... 71 Cont.	6-3 1/2 x 1 1/4	115	31x4	1235	....	1795	1795	....	....	Paterson..... 22-6-52 Cont.	6-3 1/2 x 4 1/2	120	32x4 1/2	....	1390	1425	2395	2395	
Davis..... 61-57 Cont.	6-3 1/2 x 4 1/2	120	32x4	1535	1535	b1695	2095	2195	....	Peerless..... 55-S-7 Own.	8-3 1/2 x 5	128	33x5	....	b2990	2990	b3400	3900	
Dixie Flyer..... H-S-73 H-S.	4-3 1/2 x 5	112	32x4	1175	1175	b1295	1545	1595	....	Pierce-Arrow..... Own.	6-4 x 5 1/4	138	33x5	5250	b5250	5250	6800	7000	
Dodge Brothers..... Own.	4-3 1/2 x 4 1/2	114	32x4	850	880	....	980b	1140	1195h	Pilot..... 6-50 H-S.	6-3 1/2 x 5	126	32x4 1/2	2050	2000	2050	2950	3000	
Dorris..... 6-33 Own.	6-4 x 5	132	33x5	3330u	b3350	3950	4985b	5750	....	Premier..... 6-D Own.	6-3 1/2 x 5 1/2	126 1/2	32x4 1/2	3150	b3100	3250	4300	5100	
Dort..... D-11 Cont.	4-3 1/2 x 5	108	31x4	885	885	....	1265	1385	1065h	Premcar..... 6-40-A Falls.	6-3 1/2 x 4 1/4	117	32x4	1095	1095	....	1750	1825	
Driggs..... Own.	4-2 1/2 x 4 1/2	104	30x3 1/2	1275	1275	....	1650	1975	....	R & V Knight..... R Own.	4-3 1/2 x 5	116	32x4	....	1665	....	2385	2475	
Duesenberg..... Straight Own.	4-3 1/2 x 5 1/4	134	33x5	6500	6500	6750	7800	7800	....	R & V Knight..... J Own.	6-3 1/2 x 4 1/2	127	32x4 1/2	2475	b2475	2475	3015	3105	
Du Pont..... A Cont.	4-3 1/2 x 5 1/4	124	32x4 1/2	3000	3200	....	3800	4000	....	Reo..... T6 & U6 Own.	6-3 1/2 x 5	120	33x4	1595	n1645	1485	b2355	2435	
Durant..... A-22 Cont.	4-3 1/2 x 1 1/4	109	31x4	n990	890	....	1335	1335	....	Revere..... C Dues.	4-1 1/2 x 6	131	32x4 1/2	3200	3200	3200	4000	....
Durant..... B-22 Anst.	6-3 1/2 x 4 1/2	123 1/2	32x4 1/2	1600	1650	....	2250	2400	....	Rickenbacker..... A Own.	6-3 1/2 x 4 1/2	117	32x4	....	1485	....	1885	1985	
Earl..... 41 Own.	4-3 x 5 1/4	112	32x4	1485	1095	950b	b1395	1795	....	Roamer..... 6-54-E Cont.	6-3 1/2 x 5 1/4	128	32x4 1/2	2685	b2185	2685	b3425	3585	
Elcar..... K-1 Lye.	4-3 1/2 x 5	118	33x4	1095	1095	n1095	1315	2065	....	Roamer..... 4-75-E Dues.	4-1 1/2 x 6	128	32x4 1/2	3785	b3485	b3650n	....	b4650	
Elcar..... 7-R Cont.	6-3 1/2 x 4 1/2	118	33x4	1395	1395	n1395	1975	2065	....	Rolls-Royce..... Own.	6-4 1/2 x 4 1/4	143 1/2	33x5	....	10,900	....	....	....
Elgin..... K-1 Falls.	6-3 1/2 x 1 1/4	118	33x4	1315	1295	b1345	1695	1635	1245k	Saxon..... 125 Own.	4-3 1/2 x 5	112	32x4	1195	1195	....	1795	1795	
Essex..... Own.	4-3 1/2 x 5	108 1/2	32x4	....	1045	....	1145k	....	....	Sayers Six..... DP Cont.	6-3 1/2 x 4 1/2	118	33x4	1615	1615	....	2645	2645	
Ford..... T Own.	4-3 1/2 x 4	103	32x3 1/2	319	348	u235	580	645	....	Seneca..... L-2 & O-2 Lye.	4-3 1/2 x 5	108	30x3 1/2	875	875	....	....	....
Fox..... Own.	6-3 1/2 x 5	132	32x4 1/2	3300	3900	....	4930	....	....	Seneca..... 50 & 51 Lye.	4-3 1/2 x 5	112	31x4	1095	1095	....	....	....
Franklin..... 10-A Own.	6-3 1/2 x 4	115	32x4	1300	1950	n1750	2190	2250	1035k	Sperling..... A Supr.	4-3 1/2 x 5	114	32x4	980	980	....	1685	1685	
Gardner..... T-R & G Lye.	4-3 1/2 x 5	112	32x4	895	895	....	1035k	1315	....	Standard..... 98 Own.	8-3 1/2 x 5	127	31x4 1/2	2150	b2395n	2395	2750	3200	
Grant..... Walkr	6-3 1/2 x 1 1/2	116	32x4	1335	1385	....	1895	1945	....	Stanley..... 740 Own.	2-4 x 5	130	32x4 1/2	2700	2700	2700	3775	3950	
Gray..... Own.	4-3 1/2 x 1	100	30x3 1/2	....	490	....	....	760	....	Stanwood Six..... Cont.	6-3 1/2 x 4 1/2	118	33x4	1765	1765	....	2750	....
H.C.S..... Series 3 Weid.	4-3 1/2 x 5 1/2	120	32x4 1/2	2475	2475	3250n	3250	3475	....	Star..... Cont.	4-3 1/2 x 1 1/4	102	30x3 1/2	319	348	u285	580	645	
Handley-Knight..... Own.	4-4 1/2 x 1 1/2	125	32x4 1/2	....	....	2650	3450	3450	....	Stearns-Knight..... SKL4 Own.	4-3 1/2 x 5 1/2	125	31x4 1/2	2250	2250	2450	3150	3450	
Hanson..... 33 Cont.	6-3 1/2 x 1 1/4	114	31x4	....	995	....	....	2555	....	Stearns-Knight..... 6 Own.	6-3 1/2 x 5	130	31x4 1/2	2700	2700	2850	3350	3700	
Hanson Six..... 60 Cont.	6-3 1/2 x 4 1/2	121	32x4	1535	1595	b1795	b2475	2475	....	Stevens-Duryea..... 90 Own.	6-3 1/2 x 4 1/2	122	33x4 1/2	1575	1595	e1625	2450	2550	
Hatfield..... A-42 H-S.	4-3 1/2 x 5	115	32x4	....	1345	b1345	1950	1950	....	Stevens-Duryea..... E Own.	6-4 1/2 x 5 1/2	138	35x5	7250	b6900	6800	8600	b8900	
Haynes..... 75 Own.	6-3 1/2 x 5	132	33x5	2235	b2395	2395	....	3395	....	Studebaker..... Light Six Own.	6-3 1/2 x 4 1/2	112	32x4	975	975	u785	1225	1550	
Haynes..... 53 Own.	6-3 1/2 x 5	121	32x4 1/2	1515	1495	....	2095	2395	....	Studebaker..... Special Six Own.	6-3 1/2 x 5	119	32x4	1250	1275	b1275	1875	2050	
Holmes..... Series 4 Own.	6-3 1/2 x 1 1/4	126	34x4 1/2	....	b2500	2530	b3300	3600	....	Studebaker..... Big Six Own.	6-3 1/2 x 5	126	33x4 1/2	u1300	1650	n1785	2275	2475	